CITY COUNCIL AGENDA ITEM COVER MEMO

Agenda Item Number_____

Meeting Type: Regular

Meeting Date: 12/20/2012

Action Requested By:
Engineering

Agenda Item Type
Resolution

Subject Matter:

Agreement with Uretek USA, Inc.

Exact Wording for the Agenda:

Resolution authorizing the Mayor to enter into an agreement with Uretek USA, Inc. for Redstone Gateway Box Culvert Weep Hole Plugging and Sealing, Project No. 65-13-SP06

Note: If amendment, please state title and number of the original

Item to be considered for: Action

Unanimous Consent Required: No

Briefly state why the action is required; why it is recommended; what Council action will provide, allow
and accomplish and; any other information that might be helpful.

This contract is for the filling and sealing of box culvert weep holes and other leakage points. The contract has a Not to Exceed (NTE) price of $20,965.00. Account No. 05-6500-0811-2035

Associated Cost: _____

Budgeted Item: Select...

MAYOR RECOMMENDS OR CONCURS: Select...

Department Head: _____ Date: 12/13/12

revised 3/12/2012

ROUTING SLIP
CONTRACTS AND AGREEMENTS

Originating Department: **Engineering** Council Meeting Date: **12/20/2012**

Department Contact: **Lynn Majors** Phone # **256-427-5201**

Contract or Agreement: **Professional Services**

Document Name: **Redstone Gateway Weep Hole Sealing Project No.** 65-13-SP06

City Obligation Amount: **$20,965.00**

Total Project Budget: **$20,965.00**

Uncommitted Account Balance: **0**

Account Number: **05-6500-0811-2035**

Procurement Agreements

Not Applicable	**Not Applicable**

Grant-Funded Agreements

Not Applicable **Grant Name:**

Department	Signature	Date
1) Originating		12/13/12
2) Legal		12/17/12
3) Finance		12/18/12
4) Originating		
5) Copy Distribution		
a. Mayor's office (1 copies)		
b. Clerk-Treasurer (Original & 2 copies)		

RESOLUTION NO. 12-____

BE IT RESOLVED by the City Council of the City of Huntsville, Alabama, that the Mayor be, and is hereby authorized to enter into an Agreement by and between the City of Huntsville and Uretek USA, Inc., on behalf of the City of Huntsville, a municipal corporation in the State of Alabama, which said License Agreement is substantially in words and figures as that certain document attached hereto and identified as "Agreement between the City of Huntsville and Uretek USA, Inc. for Redstone Gateway Box Culvert Weep Hole Plugging and Sealing, Project No. 65-13-SP06" consisting of twelve (12) pages plus twenty-nine (29) additional pages consisting of Attachments "A" and "B", and the date of December 20, 2012, appearing on the margin of the first page, together with the signature of the President of the City Council, and an executed copy of said document after being permanently kept on file in the Office of the City Clerk-Treasurer of the City of Huntsville, Alabama.

ADOPTED this the 20th day of December, 2012.

President of the City Council of the City of Huntsville, Alabama

APPROVED this the 20th day of December, 2012.

Mayor of the City of Huntsville, Alabama

AGREEMENT BETWEEN THE CITY OF HUNTSVILLE AND URETEK USA, INCORPORATED FOR REDSTONE GATEWAY BOX CULVERT WEEP HOLE PLUGGING AND SEALING

STATE OF ALABAMA)
)
COUNTY OF MADISON)

This Agreement is made this 20th day of December, 2012, between URETEK USA, Incorporated (hereinafter referred to as "Contractor"), and the City of Huntsville, a municipal corporation in the State of Alabama (hereinafter referred to as "City").

RECITALS

WHEREAS, the City of Huntsville has installed at the Redstone Gateway Project three storm drain lines which drain into a permanent detention pond; and

WHEREAS, the said drain lines include box culverts that contain weep holes; and

WHEREAS, the City requires that the weep holes be plugged and sealed; and

WHEREAS, URETEK USA, Incorporated has the unique experience and expertise in the area of the URETEK Method and Deep Injection Process of culvert weep-hole plugging and sealing that will enable them to plug and seal the weep holes,

WITNESSETH

NOW, THEREFORE, in consideration of the mutual promises and covenants herein contained, the parties do hereby agree as follows, to wit:

ARTICLE 1: **Statement of Work:** Contractor hereby agrees to provide the following services to the City of Huntsville:

See Attachment "A"

ARTICLE 2: **Period of Performance and Schedule:**

Within fifteen (15) days after the date of acceptance of this proposal by City Council action, the Contractor shall execute the contract and furnish to the City a payment (labor and material) bond and a performance bond each in the amount of 100% of the contract amount. A notice to proceed will not be issued until the Contractor has furnished the required bonds and insurance. No contract extension will be allowed for delays in the issuance of the notice to proceed that are a result of the Contractor failing to submit the required items within the fifteen (15) days.

It is understood and agreed that the Contractor shall commence work to be performed under this contract within fifteen (15) days from the date of this contract unless otherwise instructed in writing by the City. All work shall be carried on continuously to completion.

Unless a valid change order has been issued which alters the contract time period, all work is to be completed within thirty (30) days from the notice to proceed.

ARTICLE 3: **Contract Price:** In consideration of the services rendered hereunder, the City shall pay (at the unit price of $9.93 per pound of URETEK 486) to Contractor for the work performed pursuant to the Statement of Work a Not-to-Exceed Ceiling Price of Twenty Thousand Nine Hundred Sixty-Five and No/100 Dollars ($20,965.00). Contractor shall invoice the City on no less than a monthly basis for the services provided. The City shall pay Contractor within thirty (30) days from the date of receipt of the monthly invoice from Contractor.

The City will not be obligated to pay the Contractor any amount in excess of the NTE ceiling price and the Contractor shall not be obligated to continue performance if to do so would exceed the NTE ceiling price set forth; unless and until, the City notifies the Contractor in writing that the NTE ceiling price has been increased and specifies in the notice a revised NTE ceiling for performance under this contract. NTE ceiling price increases will be done by a written unilateral change order to the contract issued by the City that will not require the Contractor's approval. When and to the extent that the NTE ceiling price has been increased, any hours expended and material costs incurred by the Contractor in excess of the NTE ceiling price before the increase shall be allowable to the same extent as if the hours expended and material costs had been incurred after the increase in the NTE ceiling price.

ARTICLE 4: **Contractor performing as an Independent Contractor:**
In the performance of this work it is understood between the parties that the Contractor and its employees, agents, subcontractors and consultants, if any, shall be acting as independent contractors and not as an employee of the City of Huntsville. Contractor shall have no authority to obligate the City to any indebtedness or other obligation.

ARTICLE 5: **Notices:** All notices to be delivered hereunder shall be delivered to the other party by placing the same in the United States Mail, First Class postage prepaid, by prepaid overnight service through Federal Express or United Parcel Services or by hand delivery, to the addressee, addressed as follows:

City Of Huntsville
Attention: Kathy Martin
P.O. Box 308
Huntsville, Alabama 35804

URETEK USA, Incorporated
Attention: Robert Emfinger
340 Deer Run Road
Suite 100
Auburn, Alabama 36832

ARTICLE 6: **Entire Agreement:** The contract between the City and Contractor consists of this written Agreement and any documents, drawings or attachments furnished by the City and referenced herein. This written Agreement constitutes the entire agreement between the City and Contractor with reference to the Scope of Work delineated within. Except to the extent specifically excluded herein, this Contract supersedes any bid or proposals documents and all prior written or oral communication, representation and negotiations, if any, between the City and Contractor.

ARTICLE 7: **Licenses & Permits:** In order to receive the award of this contract, Contractor shall be required to possess a valid general contractor's license in accordance with Code of Alabama §§34-8-2 (1975) and (1996 amended) Code of Alabama. This general contractor's license shall be a State of Alabama general contractor's license and shall be maintained throughout the term of this contract. A valid City of Huntsville license shall also be maintained throughout the term of this contract. Additionally, Contractor shall be required to obtain and pay for all other federal, state or local permits, licenses, and fees which may be necessary or required in order to perform the work detailed herein. A City of Huntsville Contractor's License must be obtained from the City of Huntsville Inspection Department at the time signatures are obtained on contracts. A copy of City of Huntsville license shall be provided to the City at the time the contract is executed.

ARTICLE 8: **No Waiver Clause:** The failure of the City to insist in one or more instances upon the performance of any term of this Contract is not a waiver of the City's right to future performance of such terms, and Contractor's obligations for future performance of such shall continue in effect.

ARTICLE 9: **Insurance and Indemnification Requirements:** Contractor shall carry insurance of the following kinds and amounts in addition to any other forms of insurance or bonds required under the terms of the contract specifications. Contractor shall procure and maintain for the duration of the job until final acceptance by the City, or as later indicated, insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by , its agents, representatives, employees or subcontractors.

A. MINIMUM SCOPE OF INSURANCE:

1. General Liability:

Insurance will be written on an occurrence basis. Claims-made coverage will be accepted only on an exception basis after the City's approval.

Commercial General Liability

Products and Completed Operations
Contractual
Personal Injury
Broad Form Property Damage

2. Professional Liability:

Insurance may be written on a "claims-made" basis, providing coverage for negligent acts, errors or omissions in the performance of professional services. Coverage will be maintained for three years after completion of the professional services and Certificates of Insurance will be submitted to the City within reasonable economic terms. For purposes of this provision, reasonable economic terms shall mean that such coverage is carried by at least 25% of the firms within the discipline of concern in the United States. Such coverage shall be carried on a continuous basis including prior acts coverage to cover the subject project. The professional liability insurance shall contain contractual liability coverage.

3. Automobile Liability:

Business Automobile Liability providing coverage for all owned, hired and non-owned autos. Coverage for loading and unloading shall be provided under either automobile liability or general liability policy forms.

4. Workers' Compensation Insurance:

Statutory protection against bodily injury, sickness or disease or death sustained by employee in the scope of employment. Protection shall be provided by a commercial

insurance company or a recognized self-insurance fund authorized before the State of Alabama Board of Industrial Relations. The Workers' Compensation Insurance carrier or self-insured fund shall waive all subrogation rights against the City of Huntsville, its officers, employees, agents and specified volunteers.

5. Employers Liability Insurance:

Covering common law claims of injured employees made in lieu of or in addition to a worker's compensation claim.

B. MINIMUM LIMITS OF INSURANCE:

1. General Liability:

Commercial General Liability on an "occurrence form" for bodily injury and property damage:

$ 1,000,000 General Aggregate Limit
$ 500,000 Products - Completed Operations Aggregate
$1,000,000 Personal & Advertising Injury
$ 500,000 Each Occurrence

2. Professional Liability:

Insurance may be made on a "claims-made" basis:

$ 1,000,000 Per Claim

3. Automobile Liability:

$ 500,000 Combined Single Limit per accident for bodily injury and property damage.

4. Workers' Compensation:

As Required by the State of Alabama Statute

5. Employers Liability:

$ 100,000 Bodily Injury by Accident or Disease
$ 500,000 Policy Limit by Disease

C. OTHER INSURANCE PROVISIONS:

The City is hereby authorized to adjust the requirements set forth in this document in the event it is determined that such adjustment is in the City's best interest. If the insurance

requirements are not adjusted by the City prior to the City's release of specifications with regard to the project in question, then the minimum limits shall apply.

The policies are to contain, or be endorsed to contain, the following provisions:

1. General Liability and Automobile Liability Coverage's Only:

a. The City, its officers, employees, agents and specified volunteers are to be covered as Additional Insureds, as their interests may appear, as respects: liability arising out of activities performed by or on behalf of Contractor for products used by and completed operations of Contractor; or automobiles owned, leased, hired or borrowed by Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the City, its officers, employees, agents or specified volunteers. Additional Insured status on the CGL shall be through ISO Additional Endorsement CG 20 10 11 85 or equivalent that is sufficient to provide coverage as per this Agreement.

b. Contractor's insurance coverage shall be primary insurance as respects the City, its officers, employees, agents and specified volunteers, as their interests may appear. Any insurance or self-insurance maintained by the City, its officers, officials, employees, agents or specified volunteers shall be excess of Contractor's insurance and shall not contribute to it.

c. Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

2. All Coverages:

a. Contractor is responsible to pay all deductibles. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days' prior written notice by certified mail, return receipt requested, has been given to the City. Cancellation of coverage for non-payment of premium will require ten (10) days written notice to the City.

b. Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the City, its officers, employees, agents or specified volunteers.

D. ACCEPTABILITY OF INSURERS:

Insurance is to be placed with insurers with an A. M. Best's rating of no less than **B+ V.**

E. VERIFICATION OF COVERAGE:

The City shall be indicated as a Certificate Holder and Contractor shall furnish the City with Certificates of Insurance reflecting the coverage required by this document. The A.

M. Best Rating and deductibles, if applicable, shall be indicated on the Certificate of Insurance for each insurance policy. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates are to be received and approved by the City before work commences. The City reserves the right to require complete, certified copies of all required insurance policies at any time.

F. CONSULTANTS AND/OR SUBCONTRACTORS WORKING FOR THE CONTRACTOR:

Contractor shall include all subcontractors and/or consultants as insureds under its policies or shall furnish separate certificates and/or endorsements for each subcontractor and/or consultant.

G. INTELLECTUAL PROPERTY RIGHTS:

Contractor agrees to indemnify, hold harmless and defend the City from and against any and all liability, losses, judgments, damages, and expenses arising from third party claims that the Products delivered by and/or Services performed by Contractor pursuant to this Agreement infringe on or violate any patents, copyrights, or trade secrets of such third parties. This indemnification is contingent upon City providing prompt written notice of such a claim to Contractor, and granting Contractor the sole right to defend such claim. In the event of any infringement or claimed infringement, Contractor, in its sole discretion, shall: (i) modify the infringing Services to be non-infringing as long as there is no loss of functionality by such modification; (ii) obtain a license for City to use the infringing Services; or (iii) terminate the City's right to use the infringing Services and refund to City all amounts paid for such infringing Services, amortized over a period of (5) years from the acceptance of Services.

H. HOLD HARMLESS AGREEMENT:

Contractor, to the fullest extent permitted by law, shall indemnify and hold harmless the City, its elected and appointed officials, employees, agents and specified volunteers against all claims, damages, losses and expenses, including, but not limited to, court awarded attorney's fees, arising out of or resulting from the performance of the work, provided that any such claim, damage, loss or expense (1) is directly attributable to personal injury, including bodily injury or death, or to injury to or destruction of tangible property, therefrom, and (2) is caused by any negligent act or omission of Contractor or any of its consultants, or anyone directly or indirectly employed by them or anyone for whose acts they are legally liable. Such obligation should not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this paragraph.

ARTICLE 10: This agreement shall be governed by the laws of the State of Alabama. Venue of any action to enforce the terms of this agreement shall be in the state or federal courts of Madison County, Alabama.

ARTICLE 11: This Contract is intended to be an integral whole and shall be interpreted as internally consistent. What is required by any one Contract Document shall be considered as required by the Contract.

ARTICLE 12: When a word, term or phrase is used in this Contract, it shall be interpreted or construed. First, as defined herein; second, if not defined, according to its generally accepted meaning the Contractual industry; and third, if there is no generally accepted meaning in the Contractual industry, according to its common and customary usage.

ARTICLE 13: The words "include," "includes," or "including," as used in this Contract, shall be deemed to be followed by the phrase, "without limitation."

ARTICLE 14: The specification herein of any act, failure, refusal, omission, event, occurrence or condition as constituting a material breach of this Contract shall not imply that any other, non-specified act, failure, refusal, omission, event, occurrence or condition shall be deemed not to constitute a material breach of this Contract.

ARTICLE 15: Words or terms used as nouns in this Contract shall be inclusive of their singular and plural forms, unless the context of their usage clearly requires a contrary meaning.

ARTICLE 16: Time limitations contained herein, or provided for hereby, are of the essence of this Agreement.

ARTICLE 17: Contractor shall not assign its rights hereunder, excepting its right to payment, nor shall it delegate any of its duties hereunder without the written consent of the City. Subject to the provisions of the immediately preceding sentence, the City and Contractor, respectively, bind themselves, their successors, assigns and legal representatives to the other party to this Agreement and to the successors, assigns and legal representatives of such other party with respect to all covenants of this Agreement.

ARTICLE 18: L.W. Redstone, LLC and the United States of America through the Secretary of Department of the Army (Army) are considered to be third party beneficiaries to this Agreement. Otherwise, this Agreement shall inure solely to the benefit of the parties hereto and their successors and assigns. Nothing contained herein is intended to or shall create a contractual relationship with, or any rights in favor of, or any cause of action in favor of, any third party, other than L. W. Redstone, LLC and the Army against the CITY or the PROJECT MANAGER.

ARTICLE 19: Contractor shall obtain the City's written consent before placing any subcontract for furnishing any of the work called for in this contract. Consent by the City to any subcontract shall not constitute approval of the acceptability of any subcontract terms or conditions, acceptability of any subcontract price or of any amount paid under any subcontract, nor relieve Contractor of any responsibility for performing this contract.

ARTICLE 20: The Services will comply with any and all applicable federal, state, and local laws as the same exist and may be amended from time to time.

ARTICLE 21: In consideration of the signing of this Agreement, the parties hereto for themselves, their agents, officials, employees, and servants agree not to discriminate in any manner on the basis of race, color, creed, age, sex, disability or national origin with reference to the subject matter of this contract, no matter how remote. This nondiscrimination provision shall be binding on the successors and assigns of the parties with reference to the subject matter of this Agreement.

ARTICLE 22: **Lien Waivers:** Lien waivers will be required from all subcontractors working for the contractor. These lien waivers shall be included with Contractor's final payment package. The contractor is responsible for obtaining signatures from his subcontractors. If no subcontractors are used, contractor must provide a statement indicating such.
Final payment to construction contractor will be made after contractor provides the following: advertising of completion for four (4) consecutive weeks, lien waivers have been provided from all subcontractors, and all construction signs have been removed. All work shall be complete prior to advertisement of completion. Advertisement of completion shall be in a Huntsville local newspaper. The final payment request shall be submitted along with two (2) original, certified copies (with raised notary seal) of the advertisement of completion, warranties, lien waivers The advertisement of completion must read as follows:

LEGAL NOTICE (Header)
__(company name)____ hereby gives Legal Notice of Completion of Contract with ____(project name)____, ____(project no.(s)____located in the City of Huntsville, Alabama. All claims should be filed at ____(company address)_____during this period of advertisement, i.e. June 17, 24, July 1, 8, 2011 (example of dates).

ARTICLE 23: **Surety Bonds:** The Contractor shall furnish separate performance and payment bonds to the City within fifteen (15) days after the date of acceptance of this proposal by City Council action. Each bond shall set forth a penal sum in an amount not less than the Contract Price. Each bond furnished by the Contractor shall incorporate by reference the terms of this Contract as fully as though they were set forth verbatim in such bonds. In the event the Contract Price is adjusted by Change Order executed by the Contractor, the penal sum of both the performance bond and the payment bond shall be deemed increased by like amount. The performance and payment bonds furnished by the Contractor shall be in forms suitable to the City, in conformance with all the requirements of the Code of Alabama (1975), §39, and shall be executed by a surety, or sureties, reasonably suitable to the City. All bonds must be approved by the Mayor and the Clerk-Treasurer of the City of Huntsville.

ARTICLE 24: **Termination for Convenience:**

A. The City may for any reason whatever terminate performance under this Contract by the Contractor for convenience. The City shall give written notice of such termination to the Contractor specifying when the termination becomes effective.

B. The Contractor shall incur no further obligations in connection with the Work and the Contractor shall stop Work when such termination becomes effective. The Contractor shall also terminate outstanding orders and subcontracts. The Contractor shall settle the liabilities and claims arising out of their termination of subcontracts and orders. The City may direct the Contractor to assign the contractor's right, title and interest under terminated orders or subcontracts to the City or its designee.

C. The Contractor shall transfer title and deliver to the Owner such completed Work and materials, equipment, parts, fixtures, information and Contract rights as the Contractor has.

D. (1) The Contractor shall submit a termination claim to the City specifying the amounts due because of the termination for convenience together with costs, pricing or other data required by the City. If the Contractor fails to file a termination claim within six (6) months from the effective date of termination, the owner shall pay the Contractor, an amount derived in accordance with subparagraph (3) below.

(2) The City and the contractor may agree to the compensation, if any, due to the Contractor hereunder.

(3) Absent agreement to the amount due to the Contractor, the City shall pay the Contractor the following amounts:

(a) Contract prices for labor, materials, equipment and other services accepted under this Contract.

(b) Reasonable costs incurred in preparing to perform and in performing the terminated portion of the work, and in terminating the Contractor's performance, plus a fair and reasonable allowance for overhead and profit thereon (such profit shall not include anticipated profit or consequential damages); provided, however, that if it appears that the Contractor would not have profited or would have sustained a loss if the entire Contract would have been completed, no profit shall be allowed or included and the amount of compensation shall be reduced to reflect the anticipated rate of loss, if any. Costs incurred in performing the terminated portion of the work must have been incurred prior to the effective date of the termination.

(c) Reasonable costs of settling and paying claims arising out of the termination of subcontracts or orders pursuant to Paragraph B of this clause. These costs shall not include amounts paid in accordance with other provisions hereof.

The Total Sum to be paid the Contractor under this clause shall not exceed the total Contract Price, as properly adjusted, reduced by the amount of payments otherwise made, and shall in no event include duplication of payment.

ARTICLE 25: **Termination for Cause:**

A. If the Contractor persistently or repeatedly refuses or fails to prosecute the work in a timely manner, supply enough properly skilled workers, supervisory personnel or proper equipment or material, or if it fails to make prompt payment to Subcontractors or for materials or labor, or persistently disregards laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a material provision of this Contract, then the Owner may, by written notice to the Contractor, without prejudice to any other right or remedy, terminate the employment of the Contractor and take possession of the site and of all materials, equipment, tools, construction equipment, and machinery thereon owned by the Contractor and may finish the Work by whatever methods it may deem expedient. In such case, the Contractor shall not be entitled or receive any further payment until the Work is finished.

B. If the unpaid balance of the Contract Price exceeds the cost of finishing the work, including compensation for the additional professional services and expenses made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the City. This obligation for payment shall survive the termination of the Contract.

C. In the event the employment of the Contractor is terminated by the City for cause pursuant to Paragraph A and it is subsequently determined by a court of competent jurisdiction that such termination was without cause, such termination shall thereupon be deemed a Termination for Convenience and the provisions of the Termination for Convenience clause shall apply.

ARTICLE 26: **Order of Preference of Contract Documents:** In the event of any conflict, discrepancy, or inconsistency among any of the documents which make up this contract, the following shall control, and Contractor is deemed to have based its estimate of performing the work upon the order of precedence as set forth below. Interpretations shall be based upon the following order of precedence: 1) this Agreement; 2) URETEK USA, Incorporated's proposal attached hereto as Attachment "A"; and 3) Drawings (Attachment "B").

[Signatures to follow on next page]

IN WITNESS WHEREOF, the parties have executed this agreement on the day and year first above written.

URETEK USA, Incorporated

Attest:

Cindy Carney

By : Michael R. Vinton

Its: VICE PRESIDENT MICHAEL R. VINTON

CITY OF HUNTSVILLE
a municipal corporation
in the State of Alabama

Attest:

_____
Charles E. Hagood
Its: Clerk-Treasurer

By:_____
Tommy Battle
Its: Mayor

URETEK USA, Inc.
P.O. Box 2485
Carrollton, Georgia 30112
Cell: 404-310-2508

December 14, 2012

City of Huntsville
Engineering Department
320 Fountain Circle S.W.
Huntsville, AL 35801

RE: **Revised** Proposal using The URETEK Method ® and Deep Injection® Process for Redstone Gateway Project applications / culvert weep-hole plugging and sealing (of certain sections of Storm Lines A, B and C consisting of box culverts discharging into Permanent Detention Ponds)

Attention:

Uretek Holdings, Inc. (URETEK) proposes to plug and seal approximately 600 (3-inch diameter) weep holes and a portion of the rock fill behind these holes using both the patented **URETEK Deep Injection® Process** and **The URETEK Method®**. This repair protocol will be performed utilizing the proprietary formulation of expanding high-density, hydro-insensitive polyurethane resins, URETEK 486. URETEK will provide all supervision, labor, materials, supplies, insurance, tools and equipment necessary to accomplish this task.

All work under this proposal shall be performed under and subject to the attached Specifications (Exhibit I) under the attached Terms and Conditions (Exhibit II). Any Contract or Purchase Order covering work performed from this proposal shall include and reference said Specifications and Terms and Conditions.

Because subsurface soil conditions are not completely verifiable based on information at hand and it is not possible to verify accurately the size and extent of all possible voids in the project area, all work will be performed and invoiced under the unit price method. URETEK will inject up to 1,970 pounds of URETEK 486 to perform the work elements noted above in the areas indicated in the attached embedded .pdf drawings - Exhibit III) for $20,965 including a one-time mobilization / demobilization charge of $1,400. Any re-mobilization required because of lack of preparation by the customer will result in a $1,900 remobilization charge. If due to unknown circumstances, should any additional URETEK 486 be required to complete this repair, it will be invoiced at $9.93 per pound. *We will not inject any material above the estimated 1,970 pounds without your prior written approval. You will only be charged for the actual amount of material used to prosecute the job.*

If during the prosecution of the above work, open joints, addition penetrations or other possible sources of leakage are found, these can be sealed and plugged using the same processes, *with the prior, direct and written approval of your on-site representative at the above unit price.*

Should an agreement be forth coming from this proposal, the contract, purchase order, work order or any change orders should be directed to:

URETEK USA, Inc.
P.O. Box 2485
Carrollton, Georgia 30112

ATTN: Robert Emfinger

This proposal is subject to State and local sales and use taxes, as applicable, unless client provides acceptable exemption certification.

We look forward to working with you on this project. Should you have any questions or need any additional information, please contact me directly at points of contact shown above.

Best Regards,

Robert Emfinger

URETEK USA, Inc.

Attachments (6): URETEK Specifications – Exhibit I
URETEK Terms and Conditions - Exhibit II
LBYD transmittal via e-mail dated 12/06/12 from Tim Roberts with seven (7) referenced (drawings EX1.0 thru EX7.0) inclusive as - Exhibit III
Injection Plan Notes – Redstone Gateway - Exhibit IV
Deep Injection Patent - Exhibit V

PLUGGING AND SEALING OF WEEP HOLES WITH POLYURETHANE MATERIAL

11/26/12

Exhibit I

1.0 Description. This work shall consist of plugging/sealing weep holes and filling voids, in concrete culvert structures by furnishing, hauling and injecting polyurethane material into the weep holes and adjacent soils at locations shown on the attached drawings (Exhibit III).

2.0 Material.

2.1 The material for this work shall be a water blown, closed cell, high density polyurethane system with the following physical characteristics and properties:

Technical Property	Requirement
Density, min., per ASTM D1622 (air rise)	3.69 lbs / ft.^{3}
Compressive strength, minimum, per ASTM D1621	65 psi
Density, max., per ASTM D1622 (air rise)	4.2 lbs / ft.^{3}
Volume Change, maximum shrinkage (10 years)	5.0 percent
Curing Rate	90 percent of compressive strength within 15 minutes after injection

2.2 The material used for plugging and sealing to a watertight condition in these structures shall be a high-density polyurethane material, URETEK 486 Star. The material shall be a polyurethane-forming mixture, having a water insoluble diluent, that permits the formation of polyurethanes in excess water. The presence of these water insoluble diluents provides polyurethane foam with improved dimensional stability properties. This formula and these characteristics must be certified by the manufacturer.

2.3 The material shall have a warranty against shrinkage and deterioration for a period of ten years. During the warranty period, the manufacturer shall replace by injection any failed material at the manufacturer's expense.

2.4 All stored polyurethane material shall be sealed and protected from contamination of dust or any foreign material.

3.0 Contractor Pre-Qualification Requirements. The contractor shall have a minimum of ten years of experience in performing this type of work and a minimum of 500 projects on which the contractor has successfully done this type of work.

4.0 Equipment Requirements. The contractor shall provide at minimum, the following equipment:

4.1 A vehicle-mounted pumping unit capable of injecting the high-density polyurethane material at the required locations. The pumping unit shall be equipped with a device to measure the material injected to 1/10 pound and shall be capable of controlling the rate of flow of material as well as the rate of rise of the structure.

4.2 Pressure and temperature control devices capable of maintaining proper temperature and proportionate mixing of the polyurethane component materials.

4.3 Pneumatic or electric drills capable of drilling 9/16 to 3/4-inch diameter injection holes through the structure without damaging the structural integrity of the existing structure.

4.4 All necessary electric generators, compressors, heaters, hoses, containers, valves and gauges to conduct and control the work.

5.0 Construction Requirements.

5.1 The polyurethane material shall be injected through the existing weep holes until all known or encountered voids are filled. The rate and amount of material injection shall be determined by the contractor.

5.2 Injection nozzles shall prevent leakage during injection and shall be removed at completion of the injection. Any excessive material on the surface shall be removed from the area and the holes shall be sealed with the polyurethane material.

5.3 All drill tailings, excess polyurethane material and other debris shall be cleaned up and removed at the end of each working day. All removed material shall be disposed of in an environmentally acceptable manner in accordance with all federal, state and local regulations.

6.0 Method of Measurement. Polyurethane material will be measured to the nearest pound by means of electronic stroke counters, calibrated positive displacement pumps and the specific weight of the materials.

7.0 Basis of Payment. The quantities of polyurethane material injected to complete the scope of work will be paid for at the contract unit price.

EXHIBIT II

TERMS AND CONDITIONS

The Customer understands that the URETEK processes involve the installation of injection tubes and the injection of URETEK synthetic resins, which expand to fill voids and seal / plug thru-wall penetrations.

URETEK carries workman's compensation and limited general liability insurance.

URETEK will not be held liable for any damage to other parts of the structure or finish work within the work area, which may result from void filling and will not repair such damage unless such damage is due to the direct negligence of URETEK. If URETEK is found to be negligent, URETEK will be liable.

Area of work will be left free from trash and debris related to the work of URETEK crews.

URETEK makes no representations and will not be responsible for any damage to the repair area caused by ground subsidence or settlement of native soils, subsoil conditions, structural problems, dynamic or static loads much higher than the design loads at the time of the URETEK intervention, damages caused by excavations, product tampering, natural catastrophes (storms, floods, drought, tides, earthquakes, explosions, fire, etc.).

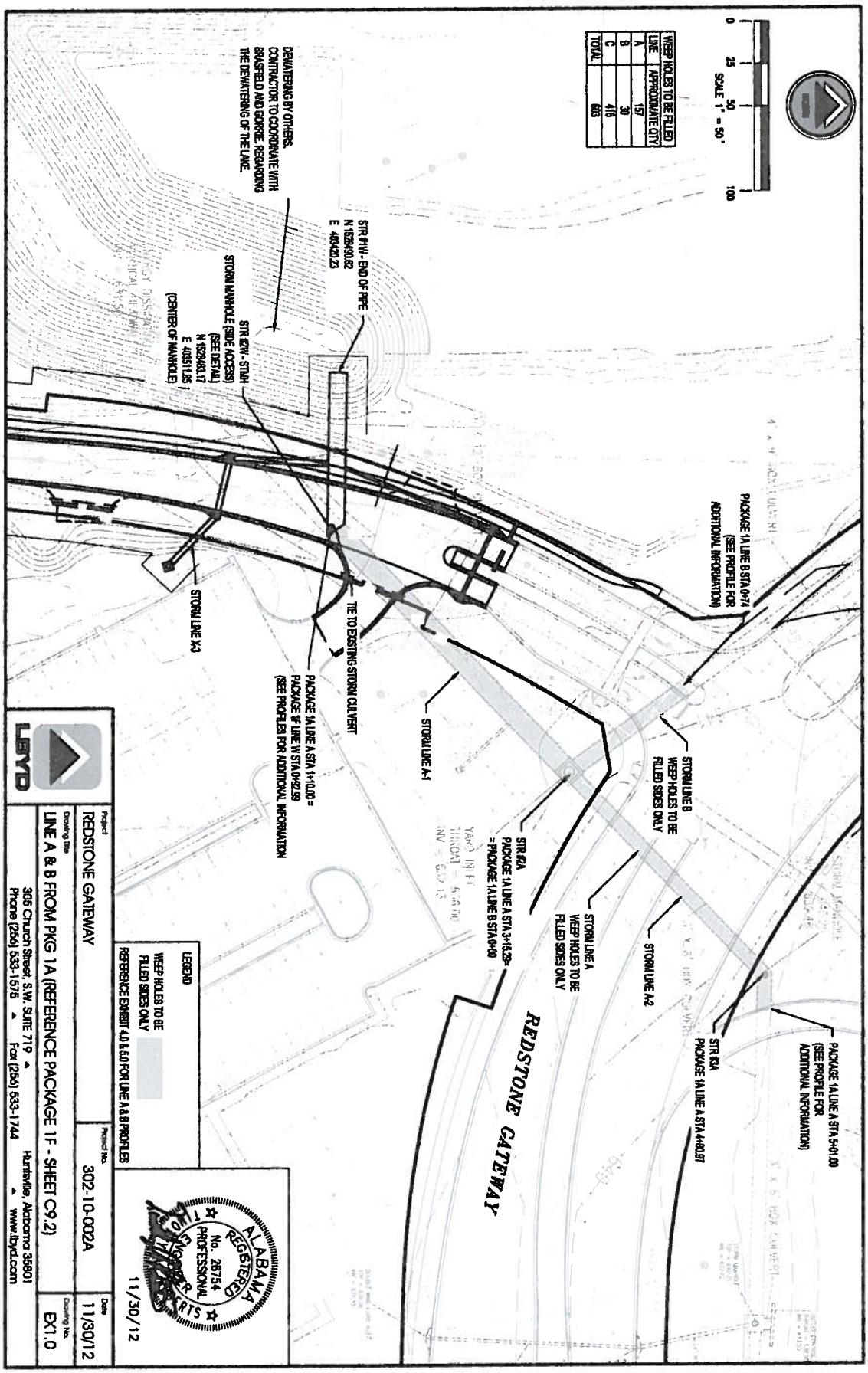
URETEK warrants that the materials injected will not shrink or deteriorate for a period of ten (10) years from the date of injection. During the warranty period, URETEK will replace, by re-injection, any material that fails to perform as warranted. This limited warranty supersedes any other warranties, expressed or implied.

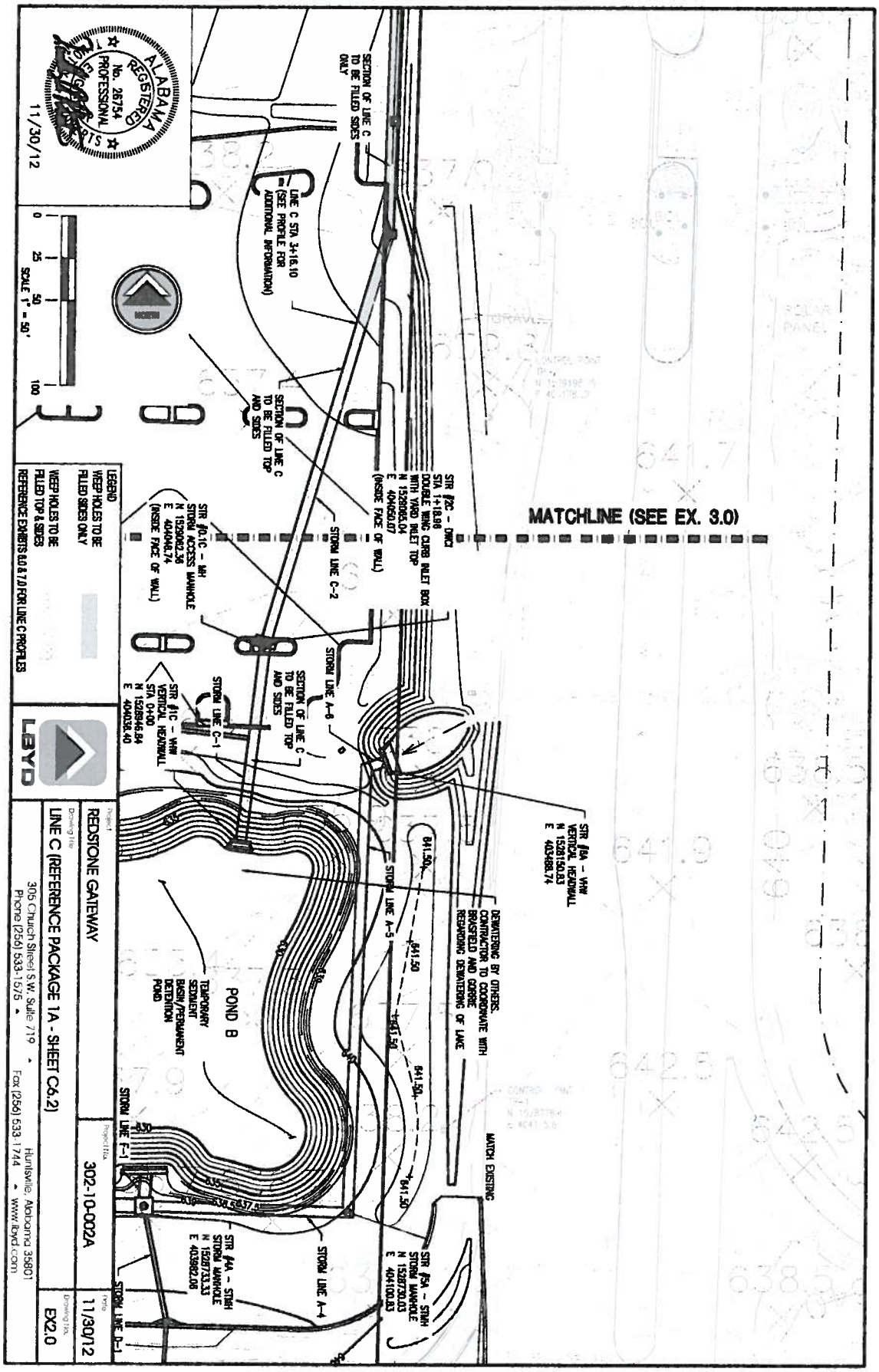
This proposal is subject to State and local sales and use taxes, as applicable, unless client provides acceptable exemption certification.

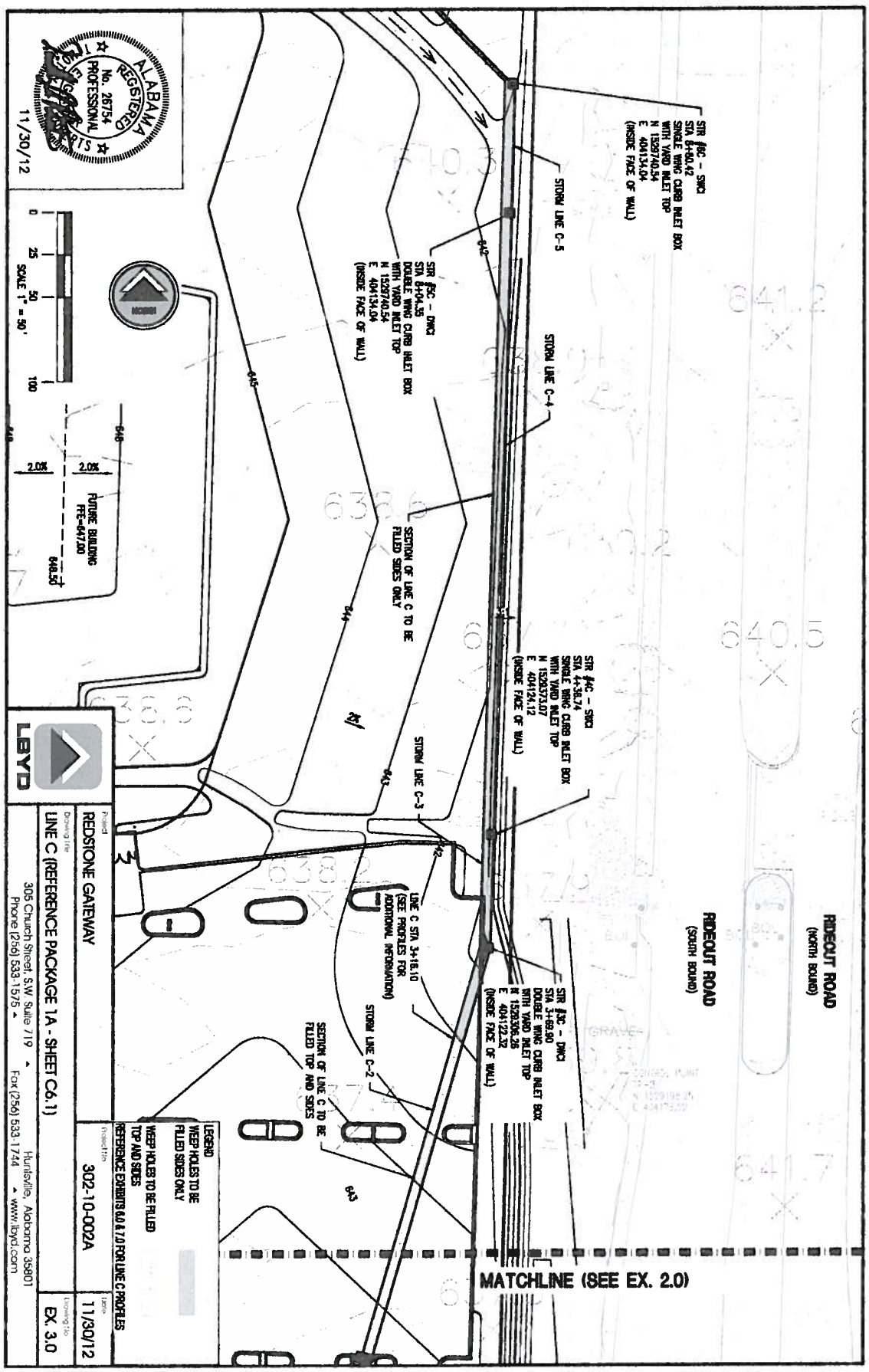
Customer will provide –

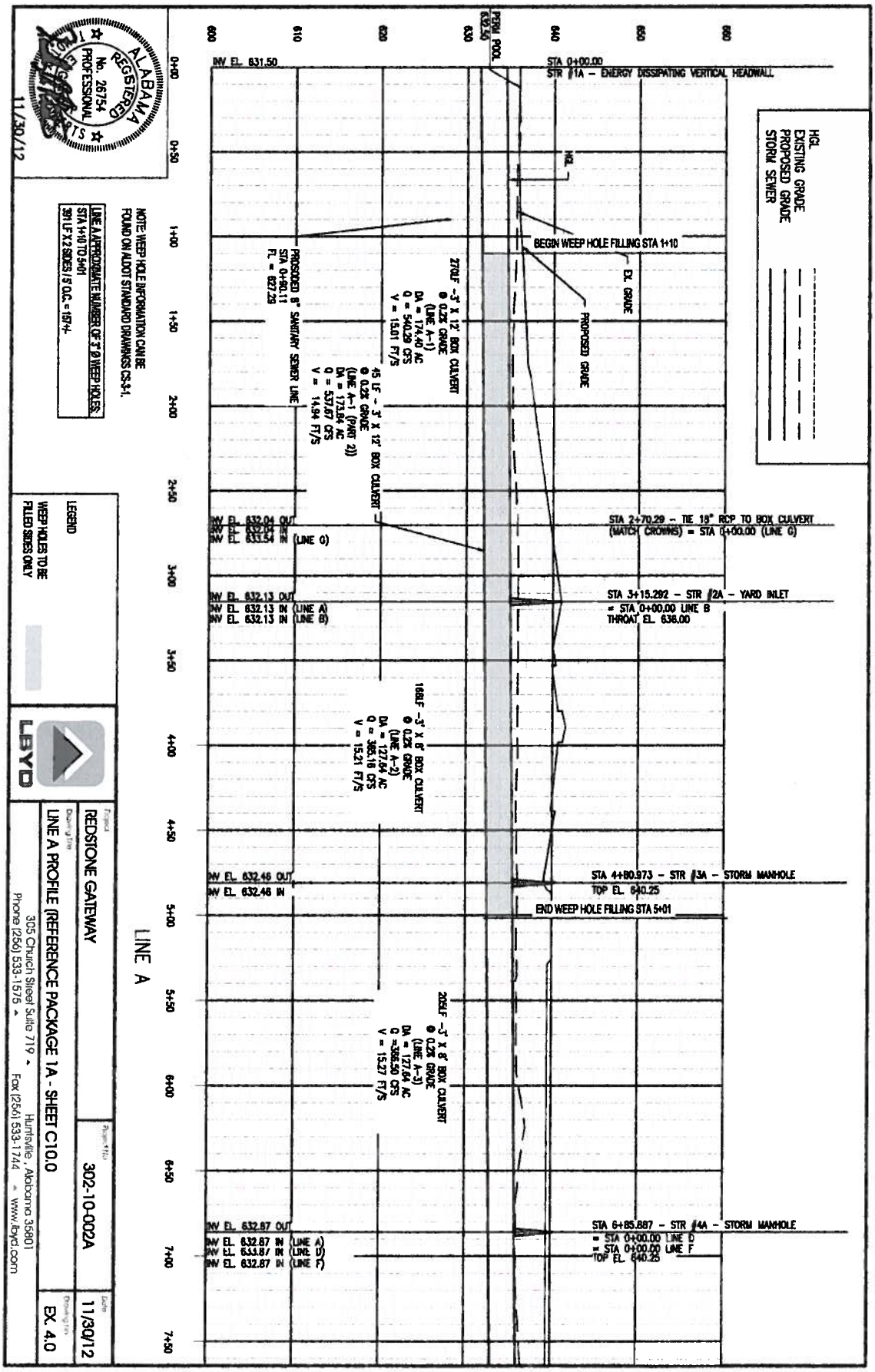
- Adequate access to the work sites.
- Any necessary authorizations or permits.
- Water supply to work area.
- Customer or representative on site during the times the work is taking place.
- Locate, identify and mark extent of weep-hole area to be injected in each culvert run.
- De-watering in the culverts to provide dry working conditions within culvert work area.

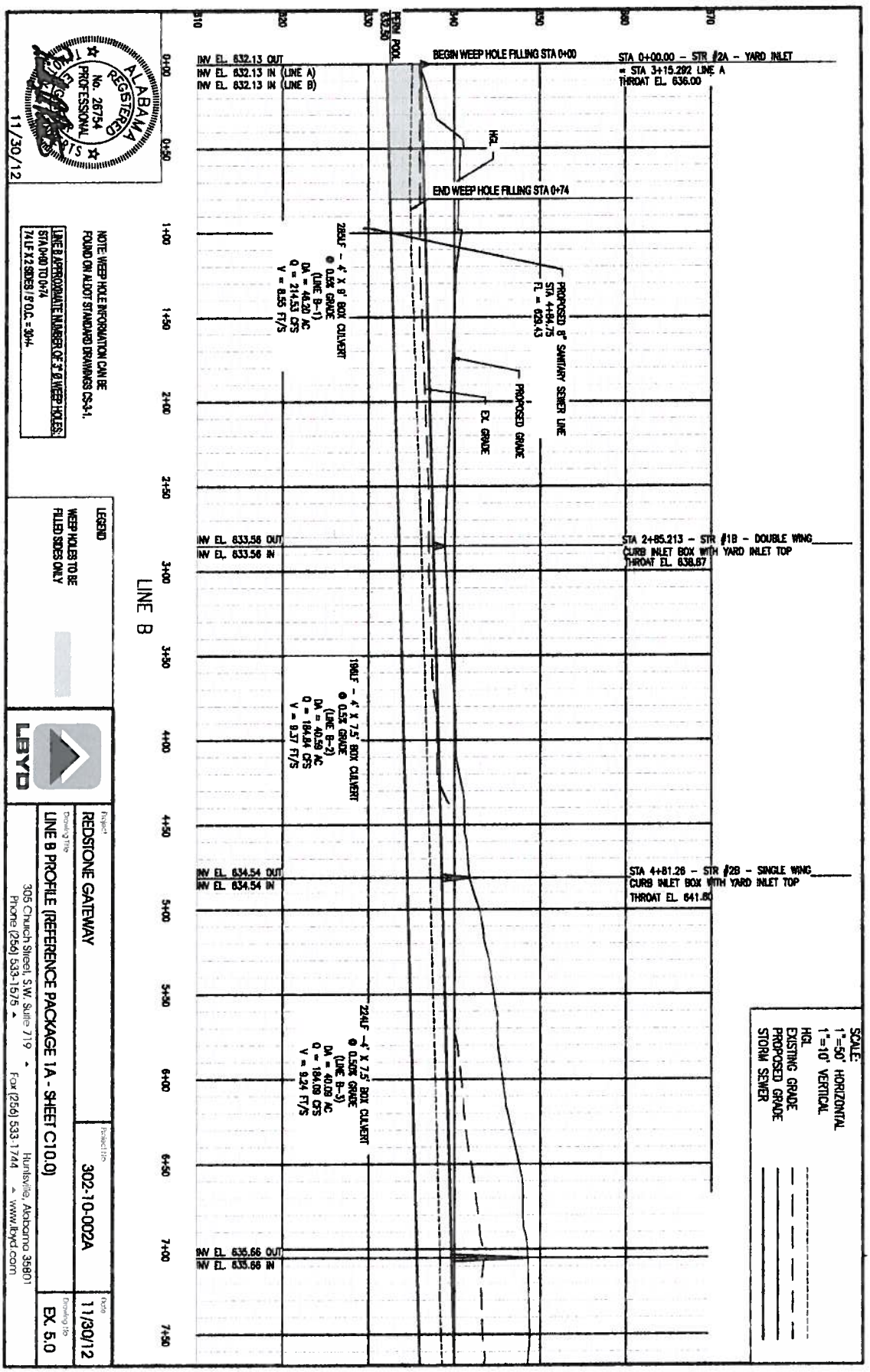
Payment is due, in full, upon the completion of the project and submittal of the invoice.

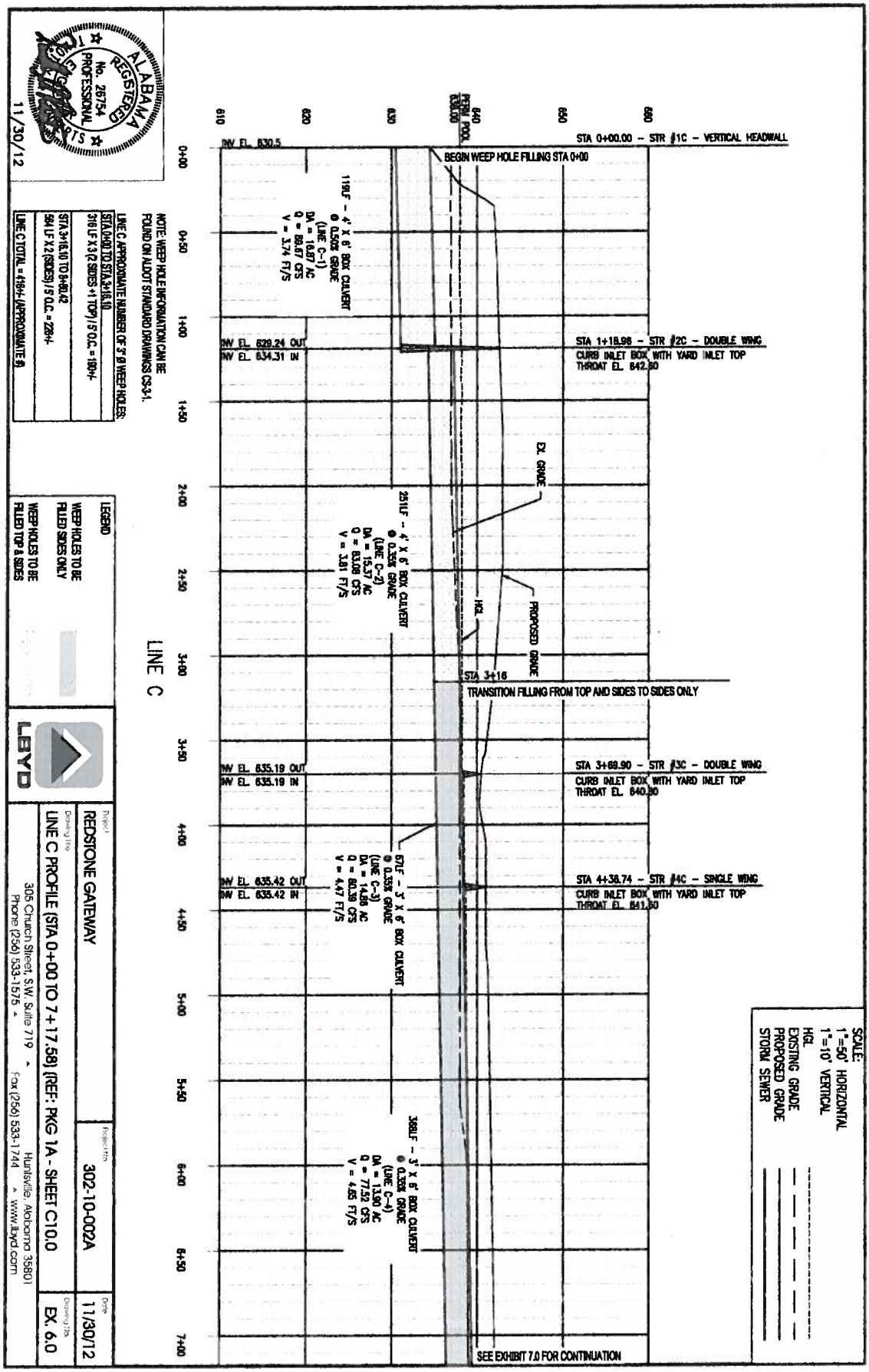

0 25 50 100
SCALE 1" = 50'
WEEP HOLES TO BE FILLED
LINE | APPROXIMATE QTY
A | 157
B | 30
C | 416
TOTAL | 603
STR #1W - END OF PIPE
N 1528490.62
E 403420.23
STR #2W - STUB
STORM MANHOLE (SIDE ACCESS)
(SEE DETAIL)
N 1528483.17
E 403511.05
(CENTER OF MANHOLE)
DEWATERING BY OTHERS.
CONTRACTOR TO COORDINATE WITH
BRASFIELD AND GORRIE REGARDING
THE DEWATERING OF THE LAKE.
STORM LINE X-3
TIE TO EXISTING STORM CULVERT
PACKAGE 1A LINE A STA 1+10.00 =
PACKAGE 1F LINE W STA 0+92.89
(SEE PROFILES FOR ADDITIONAL INFORMATION
STORM LINE A-1
PACKAGE 1A LINE B STA 0+74
(SEE PROFILE FOR
ADDITIONAL INFORMATION)
STR #2A
PACKAGE 1A LINE A STA 3+15.28=
= PACKAGE 1A LINE B STA 0+00
STORM LINE B
WEEP HOLES TO BE
FILLED SIDES ONLY
STORM LINE A
WEEP HOLES TO BE
FILLED SIDES ONLY
STORM LINE A-2
STR #3A
PACKAGE 1A LINE A STA 4+60.97
PACKAGE 1A LINE A STA 5+61.00
(SEE PROFILE FOR
ADDITIONAL INFORMATION)
REDSTONE GATEWAY
LEGEND
WEEP HOLES TO BE
FILLED SIDES ONLY
REFERENCE EXHIBIT 4.0 & 5.0 FOR LINE A & B PROFILES
ALABAMA
REGISTERED
No. 26754
PROFESSIONAL
ENGINEER
11/30/12
LBYD
Project
REDSTONE GATEWAY
Project No.
302-10-002A
Date
11/30/12
Drawing Title
LINE A & B FROM PKG. 1A (REFERENCE PACKAGE 1F - SHEET C9.2)
Drawing No.
EX1.0
305 Church Street, S.W. SUITE 719
Phone (256) 533-1575
Fax (256) 533-1744
Huntsville, Alabama 35801
www.lbyd.com

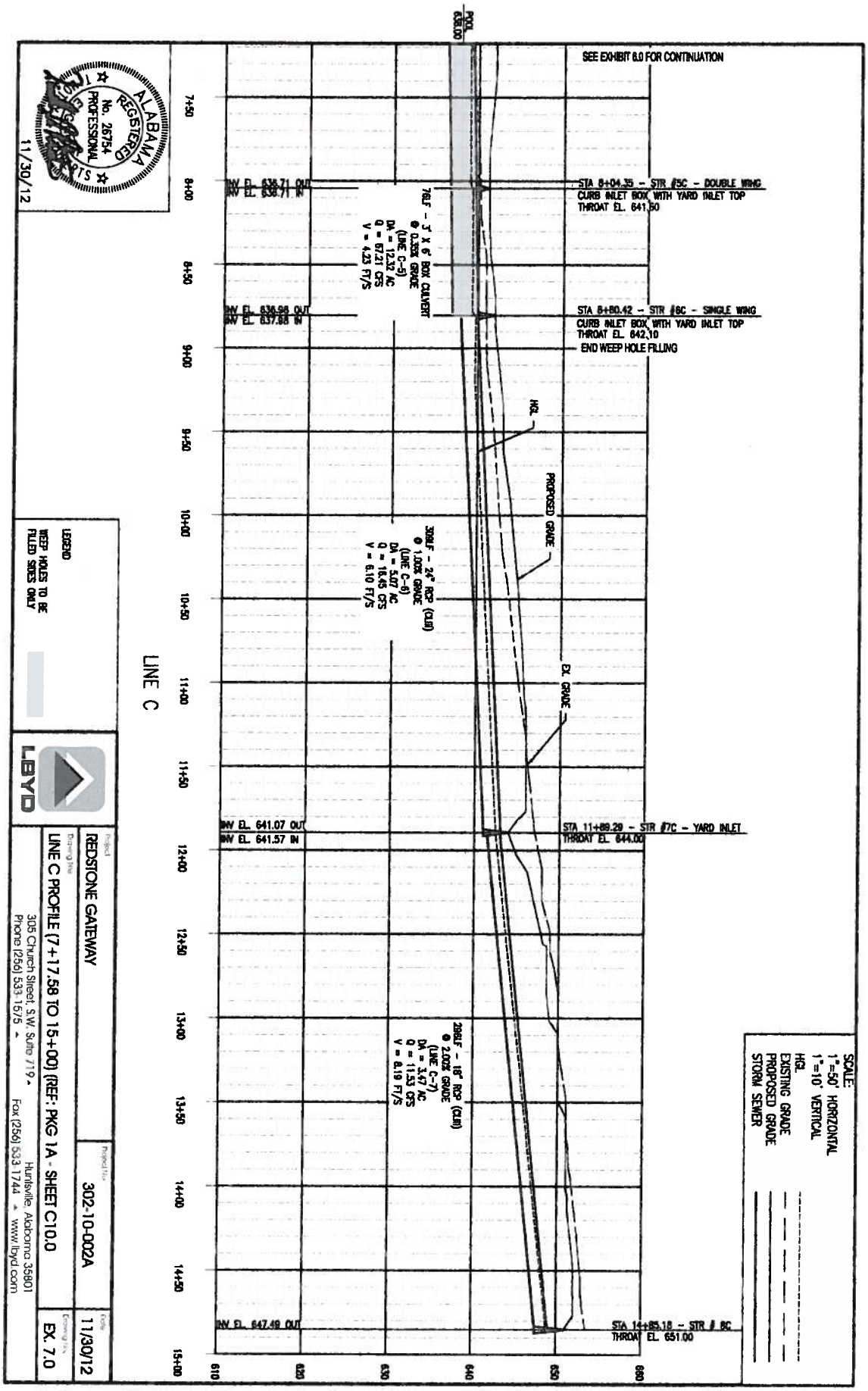

ALABAMA REGISTERED No. 26754 PROFESSIONAL ENGINEER
11/30/12
SCALE 1" = 50'
NORTH
LEGEND
WEEP HOLES TO BE FILLED SIDES ONLY
WEEP HOLES TO BE FILLED TOP & SIDES
REFERENCE EXHIBITS 6.0 & 7.0 FOR LINE C PROFILES
LINE C STA 3+16.10 (SEE PROFILE FOR ADDITIONAL INFORMATION)
SECTION OF LINE C TO BE FILLED SIDES ONLY
SECTION OF LINE C TO BE FILLED TOP AND SIDES
STR #2C - DWCI STA 1+18.88 DOUBLE WING CURB INLET BOX WITH YARD INLET TOP N 1528085.04 E 404050.07 (INSIDE FACE OF WALL)
STR #1.1C - MH STORM ACCESS MANHOLE N 1528082.36 E 404044.74 (INSIDE FACE OF WALL)
STR #1C - VHW VERTICAL HEADWALL STA 0+40 N 1528946.84 E 404038.40
STR #3A - VHW VERTICAL HEADWALL N 1528150.83 E 403988.74
MATCHLINE (SEE EX. 3.0)
STORM LINE C-2
STORM LINE C-1
STORM LINE A-6
STORM LINE A-5
STORM LINE A-4
STORM LINE A-3
STORM LINE F-1
DEWATERING BY OTHERS. CONTRACTOR TO COORDINATE WITH BRASFIELD AND GORRIE REGARDING DEWATERING OF LAKE
MATCH EXISTING
POND B
TEMPORARY SEDIMENT BASIN/PERMANENT DETENTION POND
841.50
STR #4A - STMH STORM MANHOLE N 1528733.33 E 403982.06
STR #5A - STMH STORM MANHOLE N 1528730.83 E 404100.83
LBYD
Project
REDSTONE GATEWAY
Drawing title
LINE C (REFERENCE PACKAGE 1A - SHEET C6.2)
Project No.
302-10-002A
Drawing No.
EX2.0
Date
11/30/12
305 Church Street S.W. Suite 719 Huntsville, Alabama 35801
Phone (256) 533-1575 Fax (256) 533-1744 www.lbyd.com


RIDEOUT ROAD
(NORTH BOUND)
RIDEOUT ROAD
(SOUTH BOUND)
STR #SC - SWCI
STA 0+00.42
SINGLE WING CURB INLET BOX
WITH YARD INLET TOP
N 1529740.54
E 404134.04
(INSIDE FACE OF WALL)
STORM LINE C-5
STR #SC - DWCI
STA 0+04.35
DOUBLE WING CURB INLET BOX
WITH YARD INLET TOP
N 1529740.54
E 404134.04
(INSIDE FACE OF WALL)
STORM LINE C-4
STR #SC - SWCI
STA 4+38.74
SINGLE WING CURB INLET BOX
WITH YARD INLET TOP
N 1529373.07
E 404124.12
(INSIDE FACE OF WALL)
STR #SC - DWCI
STA 3+69.90
DOUBLE WING CURB INLET BOX
WITH YARD INLET TOP
N 1529306.26
E 404122.32
(INSIDE FACE OF WALL)
SECTION OF LINE C TO BE
FILLED SIDES ONLY
STORM LINE C-3
LINE C STA 3+18.10
(SEE PROFILES FOR
ADDITIONAL INFORMATION)
STORM LINE C-2
SECTION OF LINE C TO BE
FILLED TOP AND SIDES
FUTURE BUILDING
FFE=647.00
648.50
2.0%
2.0%
SCALE 1" = 50'
0
25
50
100
LEGEND
WEEP HOLES TO BE
FILLED SIDES ONLY
WEEP HOLES TO BE FILLED
TOP AND SIDES
REFERENCE EXHIBITS 6.0 & 7.0 FOR LINE C PROFILES
MATCHLINE (SEE EX. 2.0)
ALABAMA
REGISTERED
No. 25754
PROFESSIONAL
11/30/12
LBYD
Project
REDSTONE GATEWAY
Drawing Title
LINE C (REFERENCE PACKAGE 1A - SHEET C6.1)
Project No.
302-10-002A
Date
11/30/12
Drawing No.
EX. 3.0
305 Church Street, S.W. Suite 719
Phone (256) 533-1575
Huntsville, Alabama 35801
Fax (256) 533-1744
www.lbyd.com


ALABAMA REGISTERED No. 26754 PROFESSIONAL ENGINEER
11/30/12
LINE A APPROXIMATE NUMBER OF 3" Ø WEEP HOLES
STA 1+10 TO 5+01
391 LF X 2 SIDES / 5' O.C. = 157+-
NOTE: WEEP HOLE INFORMATION CAN BE FOUND ON ALDOT STANDARD DRAWINGS CS-9-1.
LEGEND
WEEP HOLES TO BE FILLED SIDES ONLY
LBYD
LINE A
HGL
EXISTING GRADE
PROPOSED GRADE
STORM SEWER
PERM POOL (630.50)
INV EL. 631.50
STA 0+00.00
STR #1A – ENERGY DISSIPATING VERTICAL HEADWALL
BEGIN WEEP HOLE FILLING STA 1+10
EX. GRADE
PROPOSED GRADE
270LF -3' X 12' BOX CULVERT @ 0.2% GRADE (LINE A-1) DA = 174.40 AC Q = 540.29 CFS V = 15.01 FT/S
PROPOSED 8" SANITARY SEWER LINE STA 0+80.11 FL = 627.29
45 LF - 3' X 12' BOX CULVERT @ 0.2% GRADE (LINE A-1 (PART 2)) DA = 173.84 AC Q = 537.67 CFS V = 14.94 FT/S
INV EL. 632.04 OUT
INV EL. 631.54 IN (LINE G)
STA 2+70.29 – TIE 18" RCP TO BOX CULVERT (MATCH CROWNS) = STA 0+00.00 (LINE G)
INV EL. 632.13 OUT
INV EL. 632.13 IN (LINE A)
INV EL. 632.13 IN (LINE B)
STA 3+15.292 – STR #2A – YARD INLET = STA 0+00.00 LINE B THROAT EL. 638.00
168LF -3' X 8' BOX CULVERT @ 0.2% GRADE (LINE A-2) DA = 127.64 AC Q = 385.18 CFS V = 15.21 FT/S
INV EL. 632.46 OUT
INV EL. 632.46 IN
STA 4+80.973 – STR #3A – STORM MANHOLE TOP EL. 640.25
END WEEP HOLE FILLING STA 5+01
205LF -3' X 8' BOX CULVERT @ 0.2% GRADE (LINE A-3) DA = 127.64 AC Q = 386.50 CFS V = 15.27 FT/S
INV EL. 632.87 OUT
INV EL. 632.87 IN (LINE A)
INV EL. 633.87 IN (LINE D)
INV EL. 632.87 IN (LINE E)
STA 6+85.887 – STR #4A – STORM MANHOLE = STA 0+00.00 LINE D = STA 0+00.00 LINE E TOP EL. 640.25
600
610
620
630
640
650
660
0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
4+00
4+50
5+00
5+50
6+00
6+50
7+00
7+50
Project
REDSTONE GATEWAY
Project No.
302-10-002A
Drawing Title
LINE A PROFILE (REFERENCE PACKAGE 1A - SHEET C10.0
Date
11/30/12
Drawing No.
EX. 4.0
305 Church Street Suite 719 ▲ Huntsville, Alabama 35801
Phone (256) 533-1575 ▲ Fax (256) 533-1744 ▲ www.lbyd.com


ALABAMA REGISTERED PROFESSIONAL ENGINEER No. 26754
11/30/12
NOTE: WEEP HOLE INFORMATION CAN BE FOUND ON ALDOT STANDARD DRAWINGS CS3-1.
LINE B APPROXIMATE NUMBER OF 3" Ø WEEP HOLES:
STA 0+00 TO 0+74
74 LF X 2 SIDES / 5' O.C. = 30+-
LEGEND
WEEP HOLES TO BE FILLED SIDES ONLY
LINE B
LBYD
Project
REDSTONE GATEWAY
Drawing Title
LINE B PROFILE (REFERENCE PACKAGE 1A - SHEET C10.0)
Project No.
302-10-002A
Date
11/30/12
Drawing No.
EX. 5.0
305 Church Street, S.W. Suite 719 ▲ Huntsville, Alabama 35801
Phone (256) 533-1575 ▲ Fax (256) 533-1744 ▲ www.lbyd.com
SCALE:
1"=50' HORIZONTAL
1"=10' VERTICAL
HGL
EXISTING GRADE
PROPOSED GRADE
STORM SEWER
INV EL. 632.13 OUT
INV EL. 632.13 IN (LINE A)
INV EL. 632.13 IN (LINE B)
BEGIN WEEP HOLE FILLING STA 0+00
END WEEP HOLE FILLING STA 0+74
STA 0+00.00 – STR #2A – YARD INLET
= STA 3+15.292 LINE A
THROAT EL. 636.00
HGL
285LF – 4' X 8' BOX CULVERT
@ 0.5% GRADE
(LINE B–1)
DA = 40.20 AC
Q = 214.53 CFS
V = 8.55 FT/S
PROPOSED 8" SANITARY SEWER LINE
STA 4+84.75
FL = 629.43
EX. GRADE
PROPOSED GRADE
INV EL. 633.56 OUT
INV EL. 633.56 IN
STA 2+85.213 – STR #1B – DOUBLE WING
CURB INLET BOX WITH YARD INLET TOP
THROAT EL. 638.87
198LF – 4' X 7.5' BOX CULVERT
@ 0.5% GRADE
(LINE B–2)
DA = 40.59 AC
Q = 184.84 CFS
V = 9.37 FT/S
INV EL. 634.54 OUT
INV EL. 634.54 IN
STA 4+81.26 – STR #2B – SINGLE WING
CURB INLET BOX WITH YARD INLET TOP
THROAT EL. 641.80
224LF – 4' X 7.5' BOX CULVERT
@ 0.50% GRADE
(LINE B–3)
DA = 40.09 AC
Q = 184.09 CFS
V = 9.24 FT/S
INV EL. 635.66 OUT
INV EL. 635.66 IN
0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
4+00
4+50
5+00
5+50
6+00
6+50
7+00
7+50
310
320
330
340
350
360
370


SCALE:
1"=50' HORIZONTAL
1"=10' VERTICAL
HGL
EXISTING GRADE
PROPOSED GRADE
STORM SEWER
610
620
630
640
650
660
POND
630.00
0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
4+00
4+50
5+00
5+50
6+00
6+50
7+00
INV EL. 630.5
STA 0+00.00 - STR #1C - VERTICAL HEADWALL
BEGIN WEEP HOLE FILLING STA 0+00
119LF - 4' X 6' BOX CULVERT
@ 0.50% GRADE
(LINE C-1)
DA = 16.67 AC
Q = 89.67 CFS
V = 3.74 FT/S
INV EL. 629.24 OUT
INV EL. 634.31 IN
STA 1+18.98 - STR #2C - DOUBLE WING
CURB INLET BOX WITH YARD INLET TOP
THROAT EL. 642.50
EX. GRADE
251LF - 4' X 6' BOX CULVERT
@ 0.35% GRADE
(LINE C-2)
DA = 15.37 AC
Q = 83.08 CFS
V = 3.81 FT/S
HGL
PROPOSED GRADE
STA 3+16
TRANSITION FILLING FROM TOP AND SIDES TO SIDES ONLY
INV EL. 635.19 OUT
INV EL. 635.19 IN
STA 3+69.90 - STR #3C - DOUBLE WING
CURB INLET BOX WITH YARD INLET TOP
THROAT EL. 640.50
67LF - 3' X 6' BOX CULVERT
@ 0.35% GRADE
(LINE C-3)
DA = 14.89 AC
Q = 80.39 CFS
V = 4.47 FT/S
INV EL. 635.42 OUT
INV EL. 635.42 IN
STA 4+38.74 - STR #4C - SINGLE WING
CURB INLET BOX WITH YARD INLET TOP
THROAT EL. 641.50
388LF - 3' X 6' BOX CULVERT
@ 0.35% GRADE
(LINE C-4)
DA = 13.90 AC
Q = 77.52 CFS
V = 4.65 FT/S
SEE EXHIBIT 7.0 FOR CONTINUATION
LINE C
NOTE: WEEP HOLE INFORMATION CAN BE FOUND ON ALDOT STANDARD DRAWINGS 830-1.
LINE C APPROXIMATE NUMBER OF 3" Ø WEEP HOLES:
STA 0+00 TO STA 3+16.10
316 LF X 3 (2 SIDES + 1 TOP) / 5 O.C. = 190+-
STA 3+16.10 TO 8+80.42
564 LF X 2 (SIDES) / 5 O.C. = 226+-
LINE C TOTAL = 416+/- (APPROXIMATE #)
LEGEND
WEEP HOLES TO BE FILLED SIDES ONLY
WEEP HOLES TO BE FILLED TOP & SIDES
LBYD
Project
REDSTONE GATEWAY
Project No.
302-10-002A
Drawing Title
LINE C PROFILE (STA 0+00 TO 7+17.58) (REF: PKG 1A - SHEET C10.0
Drawing No.
EX. 6.0
Date
11/30/12
305 Church Street, S.W. Suite 719 ▲ Huntsville, Alabama 35801
Phone (256) 533-1575 ▲ Fax (256) 533-1744 ▲ www.lbyd.com
ALABAMA REGISTERED No. 26754 PROFESSIONAL ENGINEER
11/30/12


SEE EXHIBIT 8.0 FOR CONTINUATION
POOL 638.00
INV EL. 638.71 OUT
INV EL. 638.71 IN
76LF - 3' X 6' BOX CULVERT @ 0.33% GRADE (LINE C-5) DA = 12.32 AC Q = 67.21 CFS V = 4.23 FT/S
STA 8+04.35 - STR #5C - DOUBLE WING CURB INLET BOX WITH YARD INLET TOP THROAT EL. 641.50
INV EL. 639.66 OUT
INV EL. 639.66 IN
STA 8+80.42 - STR #6C - SINGLE WING CURB INLET BOX WITH YARD INLET TOP THROAT EL. 642.10
END WEEP HOLE FILLING
HGL
PROPOSED GRADE
308LF - 24" RCP (CLS0) @ 1.00% GRADE (LINE C-6) DA = 5.07 AC Q = 18.45 CFS V = 6.10 FT/S
EX. GRADE
INV EL. 641.07 OUT
INV EL. 641.57 IN
STA 11+89.29 - STR #7C - YARD INLET THROAT EL. 644.00
208LF - 18" RCP (CLS0) @ 2.00% GRADE (LINE C-7) DA = 3.47 AC Q = 11.53 CFS V = 6.19 FT/S
INV EL. 647.49 OUT
STA 14+85.18 - STR # 8C THROAT EL. 651.00
LINE C
7+50
8+00
8+50
9+00
9+50
10+00
10+50
11+00
11+50
12+00
12+50
13+00
13+50
14+00
14+50
15+00
610
620
630
640
650
660
SCALE:
1"=50' HORIZONTAL
1"=10' VERTICAL
HGL
EXISTING GRADE
PROPOSED GRADE
STORM SEWER
LEGEND
WEEP HOLES TO BE FILLED SIDES ONLY
LBYD
Project
REDSTONE GATEWAY
Project No.
302-10-002A
Date
11/30/12
Drawing Title
LINE C PROFILE (7+17.58 TO 15+00) (REF: PKG 1A - SHEET C10.0
Drawing No.
EX. 7.0
305 Church Street, S.W. Suite 719 • Huntsville, Alabama 35801
Phone (256) 533-1575 • Fax (256) 533-1744 • www.lbyd.com
ALABAMA REGISTERED No. 26754 PROFESSIONAL ENGINEERS
11/30/12

Memo (Exhibit IV)

To: City of Huntsville / Engineering Department

From: Jim Barber / Uretek Holdings, Inc.

Date: 12/12/12

Re: Notes for Redstone Gateway Proposal

Notes are part of Exhibit III drawings

---

1. The URETEK® Method and URETEK Deep Injection® processes will used on all weep holes inside the work areas as noted on the enclosed Exhibit III drawings as needed.
2. All construction equipment, forms, bracing and temporary structures in the work areas will be removed and replaced by others as needed. This work is specifically excluded from our Scope of Work.
3. Culvert areas to be treated will be de-watered by others prior to the start of the work and will be maintained in that condition during the term of the work. This work is specifically excluded from our Scope of Work.
4. The limits of the weep-holes to be injected will be located and marked prior to the start of this work by others.

US006634831B2

(12) **United States Patent**
Canteri

(10) **Patent No.: US 6,634,831 B2**
(45) **Date of Patent: Oct. 21, 2003**

(54) **METHOD FOR INCREASING THE BEARING CAPACITY OF FOUNDATION SOILS FOR BUILT STRUCTURES**

(75) Inventor: **Carlo Canteri**, Brunate (IT)

(73) Assignee: **Uretek Worldwide Oy**, Tampere (FI)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/308,962**

(22) PCT Filed: **Nov. 27, 1997**

(86) PCT No.: **PCT/EP97/06619**

§ 371 (c)(1),
(2), (4) Date: **Sep. 2, 1999**

(87) PCT Pub. No.: **WO98/24982**

PCT Pub. Date: **Jun. 11, 1998**

(65) **Prior Publication Data**

US 2002/0098042 A1 Jul. 25, 2002

(30) **Foreign Application Priority Data**

Dec. 2, 1996 (IT) MI96A2520

(51) **Int. Cl.**[7] **E02D 3/12**
(52) **U.S. Cl.** **405/264**; 52/742.13; 405/263
(58) **Field of Search** 405/263, 264, 405/266, 270, 258.1, 271, 269; 52/742.13, 742.14

(56) **References Cited**

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(List continued on next page.)

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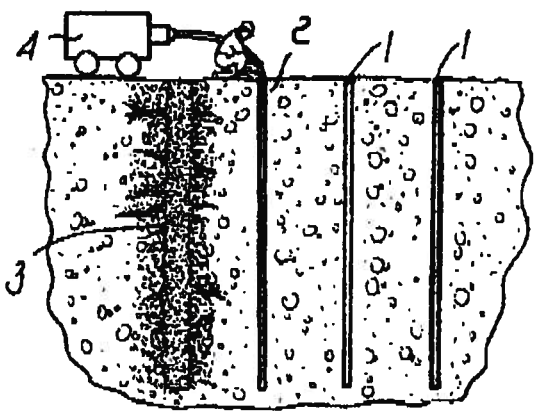
Assistant Examiner—Alexandra K. Pechhold
(74) *Attorney, Agent, or Firm*—Daniel O'Byrne

(57) **ABSTRACT**

A method for increasing the bearing capacity of foundation soils for built structures consisting of providing a plurality of holes spaced from each other deep in the soil, and injecting into the soil, through the holes, a substance which expands as a consequence of a chemical reaction, with a potential increase in volume of at least five times the volume of the substance before expansion. The expansion of the substance injected into the soil produces compaction of the contiguous soil.

23 Claims, 6 Drawing Sheets



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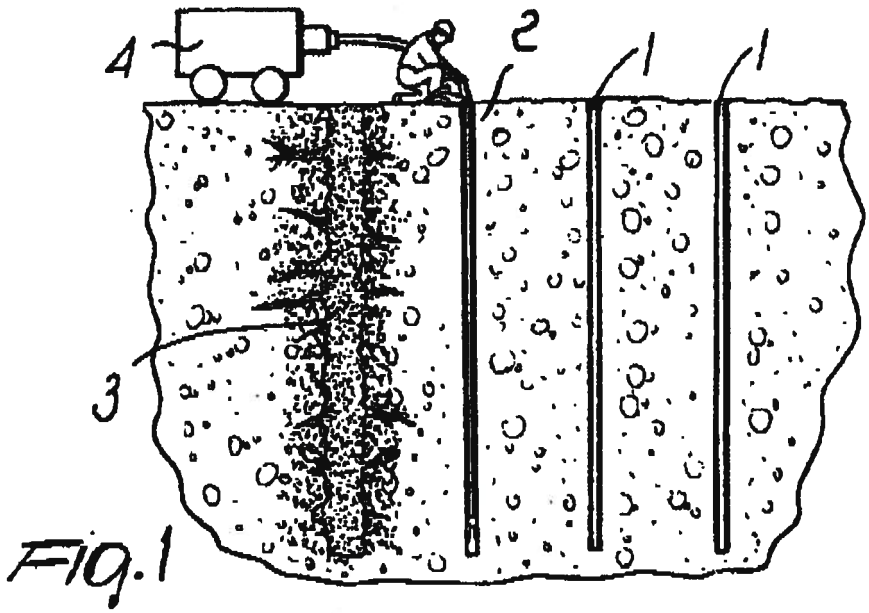


FIG. 1

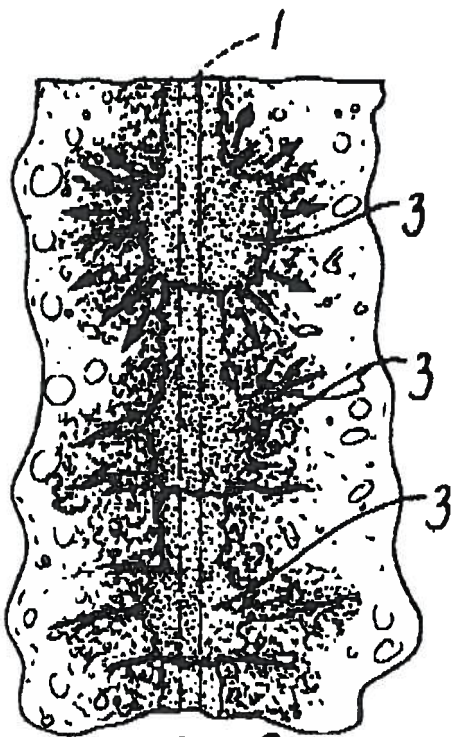


FIG. 2

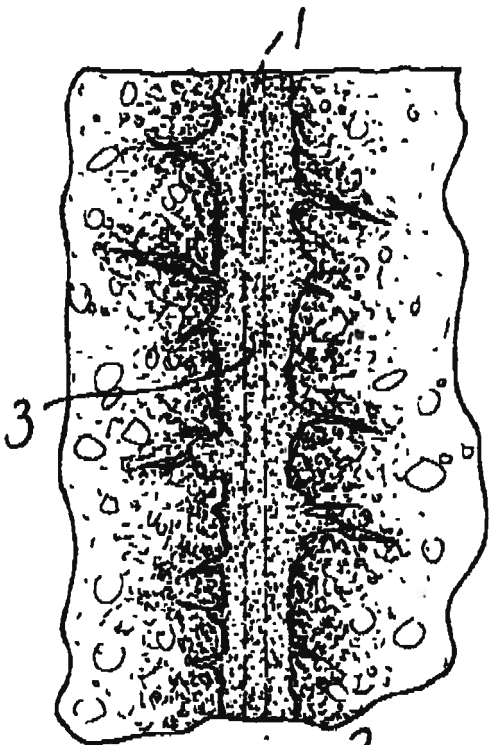


FIG. 3

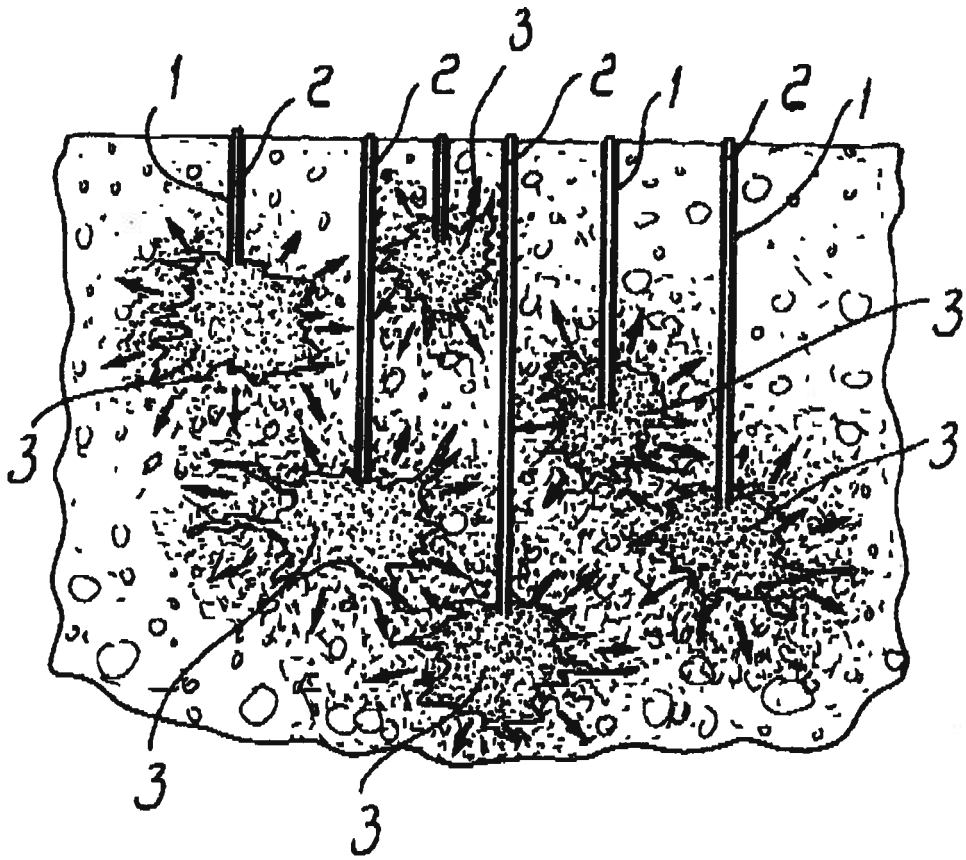


Fig. 4

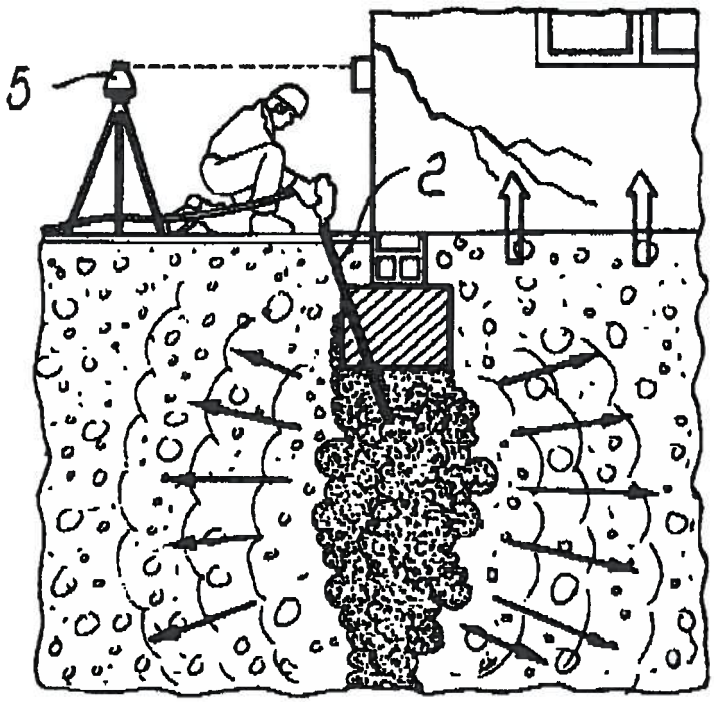


FIG. 5

FIG. 9

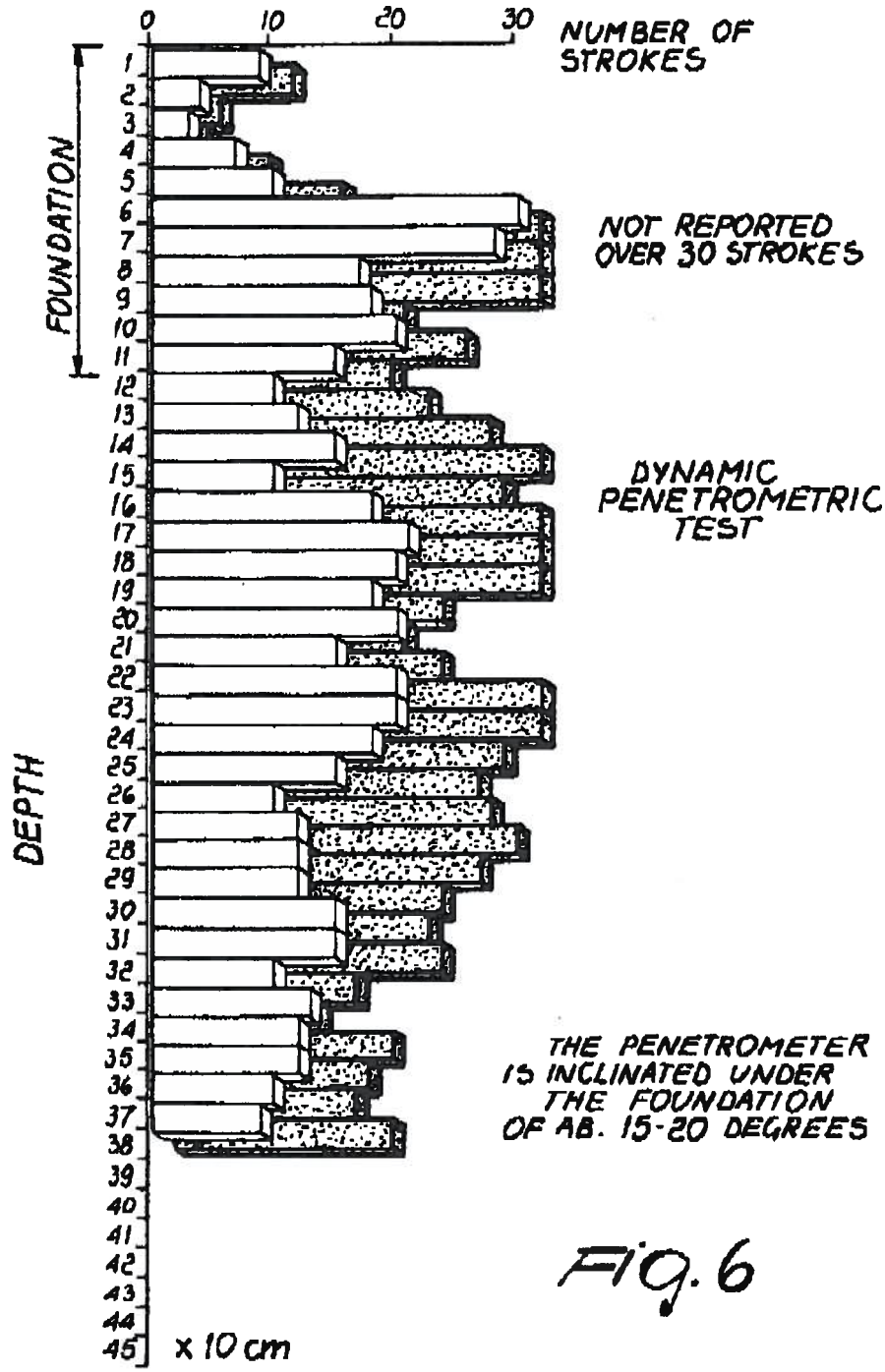
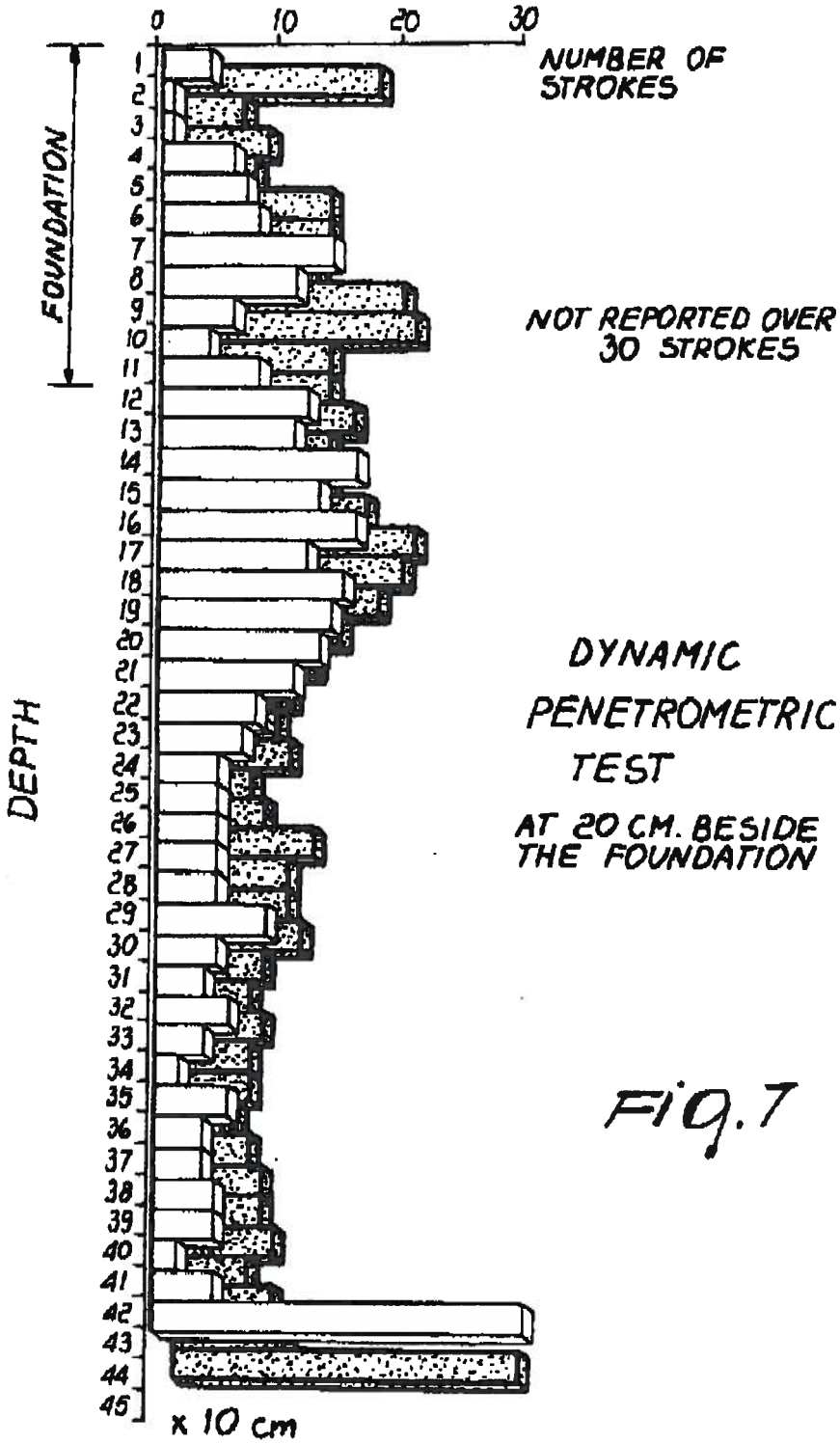

0
10
20
30
NUMBER OF STROKES
FOUNDATION
NOT REPORTED OVER 30 STROKES
DYNAMIC PENETROMETRIC TEST
DEPTH
THE PENETROMETER IS INCLINATED UNDER THE FOUNDATION OF AB. 15-20 DEGREES
x 10 cm

Fig. 6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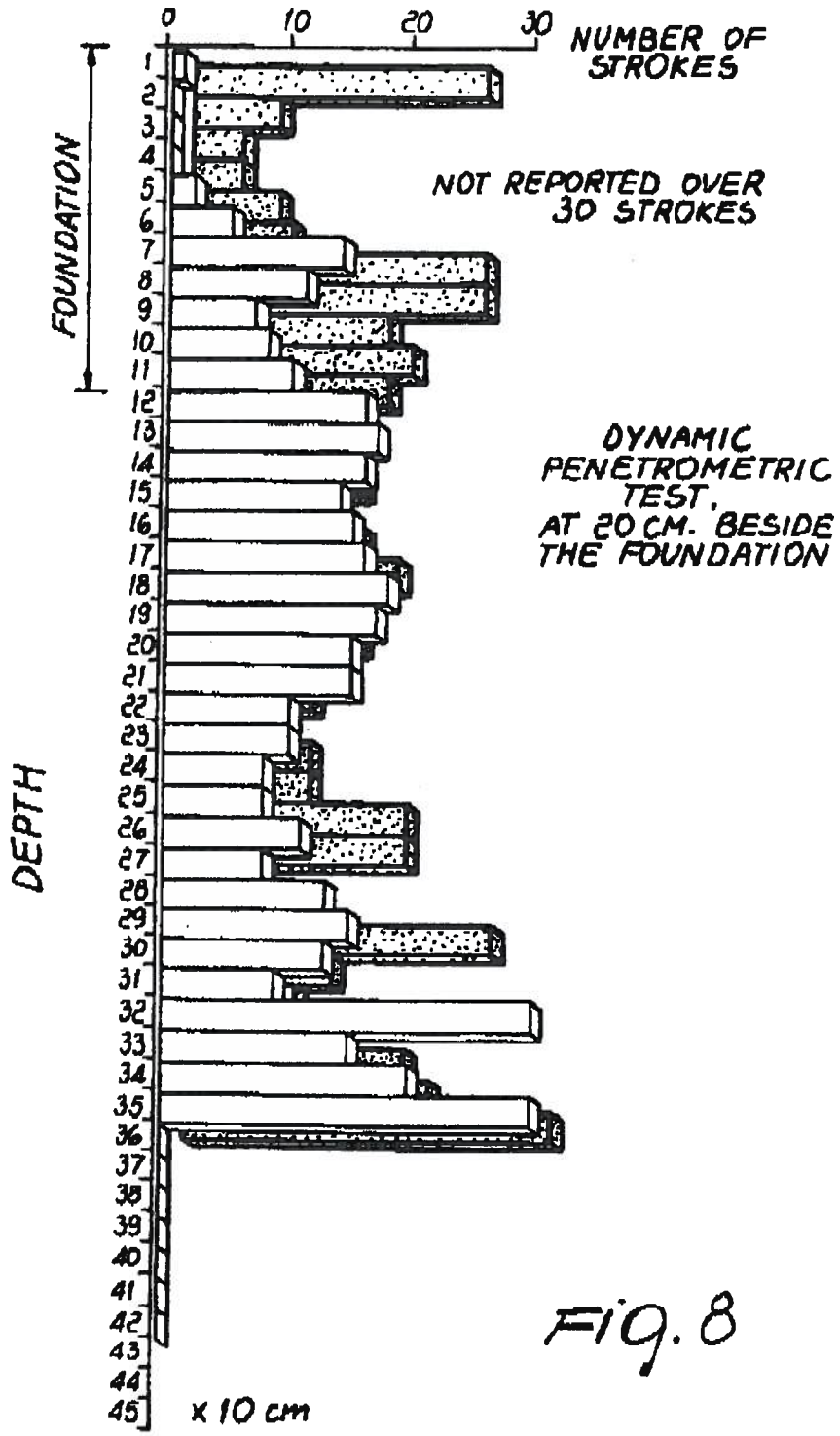
20
30
NUMBER OF STROKES
FOUNDATION
NOT REPORTED OVER 30 STROKES
DEPTH
DYNAMIC PENETROMETRIC TEST
AT 20 CM. BESIDE THE FOUNDATION
x 10 cm

Fig. 7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NUMBER OF STROKES
NOT REPORTED OVER 30 STROKES
FOUNDATION
DYNAMIC PENETROMETRIC TEST, AT 20 CM. BESIDE THE FOUNDATION
DEPTH
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x 10 cm

Fig. 8

METHOD FOR INCREASING THE BEARING CAPACITY OF FOUNDATION SOILS FOR BUILT STRUCTURES

BACKGROUND OF THE INVENTION

The present invention relates to a method for increasing the bearing capacity of foundation soils for built structures, including buildings, roadway slabs, airport runaways and equipment supporting slabs.

Any building requires the foundation soil to have a sufficient bearing capacity to support it. Otherwise, the settling of the foundation soil leads to the failure of the overlying building, regardless of whether the settling occurs in the uppermost or in the deep layers.

Before erecting any building, the bearing capacity of the soil is therefore estimated according to the weight or load which the building will apply to the soil, even using, if necessary, appropriate soil research, such as for example geological and geotechnical research.

In order to ensure the stability of the structure, the optimum dimensions of the foundations and their rigidity are calculated and the depth of the foundations is also determined, adequately balancing their weight in relation to the bearing capacity of the soil and always maintaining a good safety margin. In case of error, the building may in fact fail.

Often, however, the bearing capacity of the foundation soil is not sufficient, since the soil is compressible, as in the case of filled-in land, non-consolidated land, land with decomposing organic layers, peaty land, swampy land, land with considerable variations in water content, flooded or washed-out land with voids or with non-uniform or insufficiently aggregated masses, land with interstitial voids, et cetera; or the building is very heavy and requires a greater bearing capacity than the actual bearing capacity of the foundation soil.

Various conventional systems ensure in any case the stability of the building. Generally, these systems tend to directly transfer the weight of the building to the deeper and adequately solid soil layers or to spread the load over a wide ground surface, such as for example the method consisting in driving piles or micropiles and the like into the foundation soil. This method can be used both before and after construction.

Of course, the driving of piles and micropiles or the like after the construction of the building is extremely complicated and expensive.

Conventional methods also cope with any subsidence of the building after its construction, such as for example the method described in U.S. Pat. No. 4,567,708, which entails the injection of an expandable substance beneath the building to fill the interstices which have formed and have caused the subsidence and in order to recover the subsidence of the building, or other lifting methods.

In the method disclosed in the above-cited patent, as well as in other lifting systems, however, the foundation soil is not treated; at the most, one acts on the surface layers of the soil, and therefore if the underlying soil has not settled enough, further subsequent subsidence of said building will occur over time.

A method for ground consolidation using, an expandable substance, in which the expansion time is controlled to be slow or very slow, is known from the document DE-A-33 32 256.

SUMMARY OF THE INVENTION

A principal aim of the present invention is to solve the above problems by providing a method capable of ensuring the stability of built structures, including buildings, roadway slabs, airport runaways and equipment supporting slabs, by adequately treating the foundation soil in order to increase its bearing capacity. The term "foundation soil" is intended to designate that part of the soil having influence on the overlying built structure or that the direct or indirect influence of the built structure (J. Collas and M Harvard, Manuale di Geotecnica, Faenza Editrice S. P. A., 1986).

Within the scope of this aim, an object of the present invention is to provide a method which does not require the use of cement, concrete, or metal structures driven into the ground, such as piles, micropiles, cement injections, very deep foundations, etcetera.

Another object of the present invention is to provide a method which is simple and easy to perform and can be adopted to increase the bearing capacity of foundation soils both before and after construction of the building.

This aim, these objects, and others which will become apparent hereinafter are achieved by a method for increasing the bearing capacity of foundation soils for built structures, according to the present invention, comprising the steps set forth in claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the present invention will become apparent from the following detailed description of a preferred but not exclusive embodiment of the method according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

FIG. 1 is a schematic view of the injection of the expandable substance through holes formed in the soil;

FIGS. 2 and 3 are views of the result of the expansion of the expandable substance when the substance is injected whilst the tube used for injection is gradually retracted upwards, respectively with pauses at intermediate depth levels or with a continuous motion;

FIG. 4 is a view of the result of the expansion of the injected substance in the case of sequential injections performed with different tubes, inserted in different holes, in points spaced from each other and at different depths;

FIG. 5 is a schematic view of an injection operation, according to the invention, with constant monitoring of the sinking recovery of a building foundation;

FIGS. 6–8 are comparative diagrams of dynamic penetrometric tests carried out on a soil area treated according to the invention;

FIG. 9 is a sectional view of a soil area treated in accordance with the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The method according to the present invention substantially consists in forming in the soil a plurality of holes 1 which, if one must act on existing buildings, may or may not pass through the foundation, at different depths and preferably with a distance between two contiguous holes 1 which can vary between 0.5 m and 3 m.

The holes 1 can have variable dimensions according to requirements and can be provided substantially vertically or at an angle with respect to the vertical.

The depth of the holes may also vary according to requirements, as will become apparent hereinafter.

Tubes 2 are then inserted or driven into the holes 1 and a substance 3 expanding as a consequence of a chemical reaction between the components, with a potential volume increase of at least five times the volume of the substance before expansion, is injected into the soil through said tubes. The expression "potential volume increase" relates to the volume increase of the substance as a consequence of an expansion occurring unhindered at atmospheric pressure.

High expansion coefficients of 20–25 times the initial volume or even higher such as 30–33 may be preferred.

The expandable substance is conveniently constituted by a mixture of expandable polyurethane foam, preferably a closed-cell polyurethane foam. This substance can be constituted, for example, by a two-part foam mixed inside a mixing unit 4 connected to the injection tubes 2. The first component can be a mixture of polyols comprising a polyether polyol and/or a polyester polyol, a catalyst, such as RESINOL AL 643 produced by the Dutch company Resina Chemie, and water. The water in the composition may be 3.44% by weight. The second component can be an isocyanate MDI, such as URESTYL 10 manufactured by the same company. The mixing of these two components produces an expandable polyurethane foam the density whereof, at the end of expansion, varies according to the resistance opposed by the soil adjacent to the injection region.

The mixture may expand up to about 33 times its initial volume and the reaction time is of about 3–6 seconds, as it appears from the technical specifications of the manufacturer.

It is of course also possible to use other expandable substances having similar properties without thereby abandoning the scope of the protection of the present invention.

According to requirements, the expandable substance can be injected through the holes 1 formed beforehand in the soil in a single injection step, as shown in FIGS. 1, 2, and 3, starting from the bottom, whilst the injection tube is gradually retracted upwards, optionally with intermediate pauses, as shown in FIG. 2, so as to obtain different columns of hardened and expanded substance, or the substance can be injected, optionally by performing sequential injections at fixed and different depths in points which are three-dimensionally and uniformly spaced from each other so as to obtain regions of expanded and hardened substance within the foundation soil, as shown in particular in FIG. 4, according to requirements and according to the geological characteristics of the soil. In this last case, the tubes used for injection are left in the soil.

Once the substance 3 has been injected, since it has also penetrated in any voids and fractures of the soil thanks to its fluidity, expanding with great force and speed in all directions, it generates a force which compacts and compresses the soil all around, eliminating by compression or filling all voids and microvoids, even extremely small ones, expelling most of the water impregnating the soil, possibly agglomerating loose parts (granules and noncohesive parts) until a mass of soil is obtained which, throughout the treated layer, can no longer be compressed in relation to the weight that it has or will have to bear.

It should be noted that the expandable substance injected at different depths, in appropriately calculated points having a specific distance from each other, or along ascending lines, during expansion automatically flows towards the more compressible points, which as such offer less resistance to the expandable substance. In this manner, the regions which

most need treating are automatically treated more intensely, without leaving spaces with untreated regions.

The immediate nature of the expansion of the injected substance also allows to delimit the expansion region rather precisely, thus allowing to localize very well, in the intended points, the effect to be produced. The intense pressure applied by the injected substance to the surrounding soil is in fact due to the expansion caused by the chemical reaction and is not caused by hydraulic pressure. The expandable substance is injected through a hydraulic pressure which, however, only has the purpose of introducing the substance in the chosen points.

The immediate reaction of the injected substance, in terms of expansion and curing, prevents its migration to faraway areas, where a slow reacting substance may instead arrive. In fact, the slower the expansion reaction is the farther the substance arrives, to the detriment of the precise delimitation of the expansion effect and with consequent increase of the injection substance consumption.

Advantageously, since in the conditions of the invention the consolidation has a focused effect with low substance consumption, injection tubes may be used providing sufficient injection substance flow rates which have an inner diameter, for example of 10 mm, thus being easily insertable into and retractable from the soil. Tube diameters being smaller or larger by some millimeters are also usable. Anyway employing tubes with much larger diameters, of about 2 cm or more, difficult to drive into the soil, for obtaining high substance flow rates is not necessary.

To efficiently localize the effect of the consolidation, the injection may be carried out, with intermediate pauses. For example injection periods of 15 seconds may be alternated with pauses of 1–2 seconds or even longer. The durations of the active injection and respectively of the alternating pause periods are in fact selectable to be the more suitable considering factors such as the injection depth, the injection substance composition the length and the cross section of the injection tubes.

For obtaining a more rapid expansion reaction of the injected substance without having to switch to other compositions, where necessary, it is possible to raise by heating the temperature of the substance just before the injection operation.

As regards the hole depth, two different methods can be performed.

A first method consists in treating the entire thickness of the soil layers which are compressible or have a low bearing capacity, so as to perform consolidation up to the solid horizon of the layers having a sufficient bearing capacity, regardless of their depth. The solid horizon can be detected by means of geotechnical research conducted on the soil.

The second method instead consists in treating a layer of soil which, for reasons related to technical and/or economic convenience, does not reach down to the identified solid horizon, which might be located at an excessive depth, but is in any case thick enough to distribute the overlying weight over a wider surface. The layer of soil treated with the method according to the invention, by constituting a sufficiently compact, solid, and in any case light layer, can be effectively and broadly supported by the underlying layers of soil, even if those layers would not otherwise have a sufficient bearing capacity.

Until now, injection depth of up to 6 m have been successfully experimented, but with adapted tube cross-sections and accurately controlled substance injection flow rates, greater injection depths may be attained.

The expansion of the injected substance following the chemical reaction of its components is very fast and develops a very high expansion force: up to 40 tons per square meter or even higher.

During injection, the level of the overlying building or of the surface soil can be constantly monitored by means of a laser level 5 or another system (see FIG. 5). When the apparatus 5 indicates that the building or the soil surface begins to rise, this generally means that the compaction of the soil, in three dimensions all around the injection point, has reached very high levels which are generally higher than the required minimum values.

Through the constant monitoring operation, the precise moment when the soil begins rising at a precise spot, due to the narrowly focused expansion force, and further the exact amount of the lifting are accurately detected and may be controlled in real time.

The mass of injected substance, by reacting chemically, in fact expands with great force in all directions, and when the apparatus detects even a small rise at the surface, this means that the expandable substance has encountered less resistance in expanding in the vertical direction with respect to all other directions and that therefore the soil lying below and around the injected substance withstands and "rejects" all the weight (which is dynamic and therefore multiplied) not only of the entire mass of soil (and of any building) which rests statically thereon, but also of all the surrounding mass displaced (by friction and cohesion) at a load diffusion angle which is usually calculated at around 30° and is simply inverted. The raised soil, too, undergoes compression.

By repeating this operation at different depth levels (spaced by approximately 1 meter from each other, but variably according to the kind of soil and to the bearing capacity to be obtained), at each level, a greater bearing capacity is obtained than the required one. By acting in this last manner and by performing continuous injections along rising columns, wherein tree-like shapes are formed with a very irregular configuration, with protrusions, bumps, and projections even of considerable size produced by the different resistance of the soil to compaction and to the possible presence of interstices or fractures in the soil, in any case the entire mass and the treated layer of soil are compressed, packed and compacted; the water content decreases considerably; and the soil becomes a valid foundation soil adapted to stably support the building which lies above or is to be built.

The expandable substance can have a density varying indeed according to the resistance opposed by the surrounding soil to its expansion. In most cases, density can vary between 100 kg/m^3 and 300 kg/m^3. There may also be higher densities, since the density of the expanded substance is directly proportional to the resistance which it encounters to its expansion. The compression resistance of the expanded substance itself is a function of density.

A substance with a density of 100 kg/m^3 offers a resistance of approximately 14 kg/cm^2, whilst at a density of 300 kg/m^3 compression resistance is approximately 40 kg/cm^2. These values are far higher than those normally required for a foundation soil. In any case, where higher compression resistance values are required, even at different depths of the same soil, there is also a greater weight and therefore a higher resistance to expansion; accordingly, a denser and therefore stronger material forms automatically.

In any case, it is possible to momentarily add weight to a soil surface or to a building.

In practice, the injected and hardened expanded substance does not support the overlying building on its own, though

helping to achieve this purpose; the weight of the building is effectively supported by the foundation soil treated with the method according to the invention.

In practice it has been observed that the method according to the invention fully achieves the intended aim and objects, since it allows, in a very simple, rapid, effective, and final manner, to increase the bearing capacity of foundation soils until they fully comply with construction requirements.

Typically, in what seems to be a general trend in ground consolidation techniques, see for example the document DE-A-33 32 256, a very rapid expansion, with very high expansion coefficients, creating rapidly increasing pressures in the treated soil, is purposely avoided, since it was shown to provoke unwanted, mainly vertical, fissures in the treated mass ground.

In the conditions of the invention, however, it has surprisingly been noted that fissures occurring between soil masses, not only do not affect the soil compaction, but can in fact be advantageously exploited.

Technical tests and studies, carried out on built lots where the consolidation method of the invention has been used, have demonstrated that the expansion of the injected material occurs first in directions where the soil offers less resistance, but only for a limited extent. In the case of a built spot this happens, in the first place, laterally to the foundation and not in the vertical direction, where the weight of the building acts.

Only after the ground compaction degree is such as to provide a resistance to the lateral expansion forces well exceeding the weight force exerted by the building, a vertical force is obtained such as to raise the foundation and the building. In fact it is not only the weight of the building which has to be compensated for, but also other resistant forces, such as part of the weight of adjacent constructions, lateral friction forces and the flexural strength of the built structure itself.

While an immediate reaction of the injected material, in terms of expansion and solidification, may provoke indeed fissures between soil masses forced to move with respect to each other by rapidly increasing, strong forces, a certain quantity of the injected substance appears in fact to fill up the fissures so as to "weld" satisfactory the soil masses, at least in the area to be consolidated, which is immediately close to the injection site and under the foundation of the built structure. For exemplification see FIG. 9, where a "welded" fissure may clearly be seen.

Penetrometric tests, the results whereof are shown in the diagrams of FIGS. 6–8, have been carried out both under built spots treated with the consolidation method according to the invention, after a soil lifting has been sensed by the level apparatus, and laterally thereto, in close vicinity, at about 20 cm from the foundation.

From these diagrams showing comparatively the soil bearing capacity before consolidation (the not shadowed prisms) and after the consolidation (the shadowed prisms), clearly appears that the main consolidation occurs under the foundation, between 120 and about 300 cm of depth (FIG. 6), while at only 20 cm laterally from the foundation, the consolidation appears, at the same depths as before, significantly diminished (FIG. 7).

It is believed that this clearly shows the focused effect of the consolidation carried out according to the invention which practically provides a noteworthy reinforcement of mainly the soil under the foundations.

The diagram of FIG. 8, drawn in the condition where an amount of expandable substance has been injected which

has not provoked any detectable lifting reaction of the soil under the building foundation, shows that in fact, laterally, at only 20 cm from the foundation, practically no effective soil compaction has occurred which would have allowed generation of the vertical force necessary to the lifting and thereby also limiting the area where fissures may occur.

The method according to the invention has successfully been applied to consolidate the ground and to compensate subsidences under heavily loaded foundations in airports, such as those of the runaways, in industrial and commercial constructions such as those of roadways and equipment supporting slabs, as well as under very old, historic buildings and at archaeological sites.

Checkings of treated sites have been made recently, and have all given satisfactory results. The inspections have been carried out in accordance with a procedure approved by the French Control Institute SOCOTEC consisting substantially in injecting, at a site selected by an inspector in a treated zone, at random, a small quantity of the injection substance (about 20% of the quantity initially injected). The result has been considered positive if the injection triggered at least a minimum lifting effect of the soil surface.

The method thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept; all the details may furthermore be replaced with other technically equivalent elements.

What is claimed is:

1. A method for increasing the bearing capacity of foundation soils for built a structures comprising: providing a plurality of holes spaced from each other, under the foundation of a built structure, deep in the foundation soil; injecting into the foundation soil, through said holes, a substance which expands as a consequence of a chemical reaction; producing compaction of the foundation soil contiguous to the injection one due to the expansion of said substance injected into the soil; constantly monitoring level variations of the soil and/or built structures overlying the injection zone to detect the moment when the built structures and/or the soil surface, overlying injection zone, begins to raise which is the moment in which the compaction of the foundation soil has reached levels generally higher than a required minimum value at which the soil lying below and around said injection zone withstands and rejects dynamic and static weights exerted thereon by said built structures and by overlying and adjacent soil masses, and wherein the expansion of the injected substance is cry fast with a potential increase in volume of the expanded substance being at least five times the volume of the substance before expansion.

2. A method according to claim 1, wherein the injecting step is repeated at different depth levels for producing compaction of the masses or layers of treated soil.

3. A method according to claim 2, wherein said different depth levels are spaced by approximately 1 m from each other, at each level a greater bearing capacity than the required minimum value being obtainable.

4. A method according to claim 1, wherein said monitoring step is performed with a laser level apparatus.

5. A method according to claim 2, wherein said holes are provided vertically, the injection steps being performed continuously along rising columns wherein tree-like shapes are formed with a very irregular configuration with protrusions, bumps and projections of considerable size produced by different resistance to compaction of the soil, and by the presence of interstices or fractures in the soil.

6. A method according to claim 5, wherein an entire thickness of the soil layers which are compressible or have low bearing capacity is treated so as to perform consolidation up to the solid horizon of the layers having a sufficient bearing capacity regardless of the depth at which the solid horizon is located.

7. A method according to claim 6, wherein the expandable substance is selected from substances adapted to produce immediate expansion.

8. A method according to claim 7, wherein the expandable substance comprises a mixture of two components, the first being a polyether polyol and/or a polyesther polyol, a catalyst and water, and the second being the isocyanate MDI.

9. A method according to claim 5, wherein the distance between two adjacent holes is between 0.5 m and 3 m.

10. A method according to claim 9, wherein said holes are provided at an angle with respect to the vertical.

11. A method according to claim 2, wherein the injection step comprises several active injection phases alternated with suitable pauses.

12. A method according to claim 1, wherein the injection substance is heated just before the injection step.

13. A method according to claim 8, wherein the water content is of 3.44%, by weight.

14. A method according to claim 11, wherein in the injection step, tubes are used through which the expandable substance is injected into the soil, the tubes having an inner diameter of about 10 mm.

15. The method of claim 2, wherein the built structures include any of: buildings, roadway slabs, airport runaways, and equipment supporting slabs.

16. A method according to claim 6, wherein the expandable substance is a substance comprising a mixture of polyols and an isocyanate MDI.

17. A method for increasing the bearing capacity of foundation soils for built structures comprising:

providing a plurality of holes spaced from each other deep in the foundation soil;

providing an expandable substance with very fast expansion time and with a potential increase in volume of the expanded substance being at least five times the volume of the substance before expansion;

injecting into the soil, through said holes, said substance which expands as a consequence of a chemical reaction, the injection being performed continuously along rising columns;

producing compaction of the soil contiguous to each substance injection zone due to expansion of said substance injected into the foundation soil which forms, along said columns, tree-like shapes with irregular configuration including protrusions, bumps and projections produced by different resistance to compaction of the foundation soil and due to voids, interstices or fractures present under said structure and into the foundation soil; and

constantly monitoring level variations of the soil surface and/or built structure overlying the injection zone to detect a moment when the built structure and/or the soil surface, overlying said injection zone, begins to raise which is the moment when the compaction of the soil has reached levels generally higher than a required minimum value at which the soil lying below and around said injection zone withstands and rejects dynamic and static weights exerted thereon by said built structures and by and adjacent soil masses.

18. The method of claim 17, wherein said holes are provided in the foundation soil to have a direction selected

to be any of a vertical direction and a direction forming an angle with respect to the vertical direction.

19. The method of claim 18, wherein the built structures include any of: buildings, roadway slabs, airport runaways, and equipment supporting slabs.

20. A method for increasing the bearing capacity of foundation soils for built structures comprising:

providing a plurality of holes spaced from each other, under the foundation of a built structure, deep in the foundation soil;

providing an expandable substance with very fast expansion time and with a potential increase in volume of the expanded substance being at least five times the volume of the substance before expansion;

injecting into the soil, through said holes, said substance which expands as a consequence of a chemical reaction;

producing compaction of the soil contiguous to the substance injection zone through expansion of said substance injected into the foundation soil until the soil compaction reaches levels which are generally higher than a minimum compaction value required to provide a bearing capacity of the foundation soil suitable to withstand an dynamic and static weight exerted thereon by the built structures and by overlying and adjacent soil masses; and

determining attainment of aid minimum compaction value required by constantly monitoring level variations of the soil surface and/or of the built structure overlying said injection zone to detect a moment when the built structure and/or the soil surface, overlying said injection zone, begins to raise, which is the moment when the soil lying below and around said injection zone withstands and rejects upwardly the dynamic and static weight exerted thereon by said built structures and overlying and adjacent soil masses.

21. The method of claim 20, wherein the built structures include any of: buildings, roadway slabs, airport runaways, and equipment supporting slabs.

22. A method for increasing the bearing capacity of foundation soils for built structures comprising:

establishing appropriate treatment levels located at different depths in a foundation soil requiring bearing capacity increasing, said foundation soil being at least that part of soil having to withstand dynamic and static weights exerted by a built structure and by overlying and adjacent soil masses;

providing a plurality of hole spaced from each other deep in the foundation soil so as to reach said treatment levels;

providing an expandable substance with very fast expansion time and with a potential increase in volume of the expanded substance being at least five times the volume of the substance before expansion;

injecting into the soil, through said holes said substance which expands as a consequence of a chemical reaction;

producing compaction of the soil contiguous to each substance injection zone by way of the expansion of said sub injected into the foundation soil; and

estimating the bearing capacity achieved in the foundation soil treated with expanding substance injections by constantly monitoring the level of the soil surface and/or built structure overlying the in injection zone to detect a moment when the built structure and/or the soil surface, overlying zone, begins to raise which is the moment when the compaction of the soil due to the substance expansion has reached levels generally higher a required minimum value at which the soil lying below and around said injection zone withstands and rejects dynamic and static weights exerted thereon by said built structures and by overlying and adjacent soil masses.

23. A method for increasing the bearing capacity of foundation soils for built structures comprising:

establishing appropriate eat levels located at different depths in a foundation soil requiring bearing capacity increasing, said foundation soil being at least that part of soil withstanding dynamic and tic weights exerted by a built structure and by overlying and adjacent soil masses;

providing a plurality of ho spaced from each other deep in the foundation soil so as to reach said treatment levels;

providing an expandable balance with very fast expansion time and with a potential increase in volume of the expanded substance being at least five times the volume of the substance before expansion;

injecting into the soil, through said holes, a quantity of said substance which expands as a consequence of a chemical reaction;

producing compaction of soil contiguous to the substance injection zone by way of the expansion of said quantity of substance injected into the foundation soil until the soil compaction reached levels which are generally higher than a minimum compaction value requiring to provide a bearing capacity of the foundation soil suitable to withstand any dynamic and static weight exerted thereon by the built structures and by overlying and adjacent seen soil masses; and

detecting reaching of said um compaction value required by constantly monitoring level variations of the soil surface and/or of kite built structure overlying said injection zone to detect a moment when the built structure and/or the soil surface, overlying said injection zone, begins to raise, which is the moment when the soil lying below and around said injection withstands and rejects upwardly the dynamic and static weighs exerted thereon by said built structures and overlying and adjacent soil masses; and

carrying out said expendable substance injection at said treatment levels at least until said minimum compaction value detected through said monitoring is reached.

* * * * *

ATTACHMENT "B"

CITY OF HUNTSVILLE

SOLE SOURCE JUSTIFICATION

REVISED 5/4/2010

TO: PROCUREMENT SERVICES DATE: 11/29/2012

FROM:

In order for a producer or supplier of a good or service to qualify as a "Sole Source" exception to the State of Alabama Competitive Bid Laws, the following requirements must be satisfactorily justified to comply with established case law:

NAME OF PRODUCER OR SUPPLIER: Uretek

GOOD OR SERVICE REQUESTED: Polyurethane foam

1. Is the good or service unique? Yes

2. How is the uniqueness substantially related to the intended purpose, use, and/or performance of the good or service?

   Uretek will apply a proprietary formulation of expanding in place, high density, hydro-insensitive polyurethane resin URETEK 486 to existing concrete box culverts to seal holes in those culverts rendering them watertight. The application uses both the patented URETEK Deep Injection® Process and the URETEK Method®. The process is unique in that voids are injected with liquid resin and the material transforms in place to a solid foam. During the transformation process the material expands to many times its original volume and seeks out and fills/seals not only the irregularly shaped holes in concrete, but fills voids in the gravel backfill external to the concrete. The material is unique in the sense it can be applied and reaches a significant percentage of its final strength in minutes.

   Alternatives considered mechanical plugging of holes using rubber "stoppers" but was rejected due to the irregular shape of holes and the inability to achieve a watertight seal. Chemical resins and cementitious grouts were also considered but they have almost no expansion capability and take days vs. minutes to reach their maximum strength. The time to apply these grouts is significantly longer than the application time for the polyurethane resins so the time to complete the project is longer. Nevertheless, quotes were solicited from a source providing both a chemical resin and a cementitious grout repair and a source providing only a cementitious grout repair. All three of these quotes were higher than Uretek's proposal.

3. The producer or Supplier must provide documentation that other similar goods or services cannot perform desired objectives of the City department seeking the good or service. (Attach documentation to this request).

   See attached patent.

4. Estimated Expenditure $21,000

5. Term of contract (if applicable) Anticipated notice to proceed first week of January 2013 with a duration of four weeks.

Requesting Department Head

Engineering
Department

CONCURRENCE:

Procurement Supervisor

Finance Director

City Attorney

Mayor

URETEK

CGC1513915
CUC056758

The URETEK Method™
Deep Injection™
Infrastructure™

November 26, 2012

Mr. Ron Adams
City of Huntsville
P.O. Box 308
Huntsville, Alabama 35804-3954

Dear Mr. Adams:

This is to certify that URETEK USA, Inc. is the sole licensee for the URETEK Deep-Injection process in the United States of America. This process uses expanding polyurethane materials to underseal and raise slabs/pavements and increase the bearing capacity of soils by densification to depths of 30 feet and beyond. United States Patent Number 6,634,831 B2 protects this process.

Our hydro-insensitive formulation of high-density polyurethane used in the above processes, URETEK 486 Star, is also protected by a United States Patent, Number 6,521,673. The Patented URETEK processes and URETEK 486 Star material are available only from URETEK USA, Inc., headquartered in Tomball, Texas. URETEK USA, INC. has granted the exclusive license to the URETEK processes and URETEK 486 Star material to URETEK Holdings, Inc. within the State of Alabama for work similar to that proposed by the City of Huntsville. Therefore, in the State of Alabama, URETEK processes are available only from URETEK Holdings, Inc. for said work.

We appreciate the opportunity to propose our solution to your infrastructure problems and look forward to working with you.

Sincerely,
URETEK HOLDINGS, INC.

Robert W Moody, Jr.
Chief Operating Officer

URETEK HOLDINGS, INC.
8404 Epicenter Blvd.
Lakeland, FL
33809

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